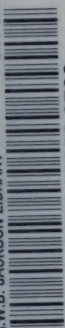


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DEPARTMENT OF COMMERCE AND LABOR
BUREAU OF STATISTICS

INDUSTRIAL EDUCATION

AND

INDUSTRIAL CONDITIONS IN GERMANY

SPECIAL CONSULAR REPORTS

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INDUSTRIAL EDUCATION IN GERMANY.

(From United States Deputy Consul Meyer, Chemnitz, Germany.)

I. THE GERMAN SYSTEM OF EDUCATION.

INTRODUCTION.

For a better and clearer understanding of what will be presented on the German system of industrial education it has been deemed wise to preface this discussion by a bird's-eye view of the entire system of education in the German Empire. A broad idea of the structure of the system of general education having thus been attained, it will be easier to place correctly the numerous classes of industrial schools, to grasp the system of industrial education in its true relation to the system of general education, and to create in the mind's eye a correct picture of the entire edifice of industrial education, from the lowest continuation and trade schools, its base, to the technical high schools, its crown.

In justice to the reader, and to avoid the formation of erroneous conclusions, it must be stated at the outset that the system which will be briefly outlined here is a general type and not a specific form, for in its details the educational system of each of the numerous States that make up the Empire differs to a greater or less extent from that of its neighbor.

PRIMARY EDUCATION.

The Volksschulen.—At the base of the German educational edifice lie the Volksschulen, or common schools. Attendance at the Volksschule is compulsory between the ages of 6 or 7 and 14. Through social and financial distinctions the Volksschule has been divided into three parallel (not consecutive) classes, the lower, middle, and higher. The lower class is attended by children of the poorer families, as the tuition fees (Schulgeld) are smallest in this division. The middle class, in which a somewhat larger tuition fee is paid, contains children from richer families; and the higher class, commonly known as the Bürger-schule (citizens' school), is attended by the richest class of children. All classes, however, are taught by equally well qualified teachers, and are given like opportunities for an education. Sometimes, also, a private school takes the place of the Volksschule.^a

When the young student reaches his tenth year a very important age has been attained from the point of view of education. This year marks, probably, the most important turning point in the child's whole educational career. At this age his parents must decide upon the general form of education which they desire their offspring to receive.

^a An effort is to be made to remove such invidious distinctions as those based upon money or social position.

Their means and position in life will largely determine the decision as to whether it will be merely a primary education (in the Volksschule), a secondary education (in the Höhere-Schule), or a higher education (in the Hochschule). If a primary education is decided upon, the child continues in the Volksschule. If a secondary education, or perchance a higher education, is to be given, then the tenth year marks the time when the child leaves the Volksschule and enters some secondary institution, such as a Gymnasium, Realgymnasium, or Ober-Realschule; or a Progymnasium, Real-Progymnasium, or Realschule; or a trade or technical school of secondary rank; or a private institution which has been ranked by the State as a secondary school. The secondary schools offer courses of either nine or six years. While the child is pursuing his course in the secondary school another decision must be made which involves not only the means of the parents but also the natural aptitudes and abilities of the child. If the means are limited, then very likely a course in a secondary school with a six years' course will be pursued by the child after the attainment of the tenth year, or probably a course in a trade school or secondary technical school, in preparation for some profession in middle life, such as that of artisan, skilled textile worker, or lower engineer, or mechanic. Young girls will very likely attend a secondary general or industrial school for girls. If sufficient means are at hand, then the son (for girls must drop out with the completion of a secondary education, though the present reform movement is already carrying them into the higher institutions of learning), will be prepared for a higher education, which will be either classical (Gymnasium), leading to some higher profession like theology, medicine, or law; or semiclassical (Realgymnasium), also leading to some higher profession; or nonclassical (Ober-Realschule), in preparation for a business career, for a course at some industrial high school, or, less frequently, for medicine or law.

Before continuing the discussion of the higher schools we must return to the child destined for a primary education only, and then follow out the structure to the secondary and higher schools, pointing out just where the industrial schools fit into the system of general education. Some of the terms already used will be explained as the story progresses. For the present it is well to remember that the tenth year marks an important turning point in the educational career of the German child.

If poverty stays the hand of the parents and closes the pathway to a better education, then the child enters upon the shortest course permissible under the law so as to bring it home early to earn its daily bread. In this case the Volksschule is completed, and at 14 years the boy or girl must set out for good or bad in the toil of life during the day. The evening generally still brings certain educational obligations, as the State usually, though not invariably, requires that graduates of the Volksschule shall continue educational work for one or several years more in continuation schools (Fortbildungsschulen), of which there are three general classes, the choice among which commonly rests with the student.

Continuation schools.—The age of 14, the year at which the Volksschule is as a rule completed, marks another, though far less important, turning point in the educational career of the child. The boy or girl may enter either a general continuation school (allgemeine Fortbildungsschule) in which are repeated and expanded some of the most

necessary studies of the Volksschule, or he or she may enter one of the two classes of industrial continuation schools—a general industrial continuation school (gewerbliche Fortbildungsschule), or a commercial continuation school (kaufmännische Fortbildungsschule). While the general continuation schools are quite uniformly distributed, it is not always true that industrial continuation schools are located where there are students who would like to enter them. As will be seen, however, they are being established in increasing numbers in all the commercial centers of the country.

Attendance at an industrial continuation school generally releases the student from attendance at a general continuation school. Where such choice is permissible, the industrial continuation school must, as a rule, maintain the cultural studies of the general continuation schools, such as religion and language. German, drawing, and arithmetic are the three great branches taught in the continuation schools, though more advanced work in geometry, physics, and chemistry is given in a few of the best schools. To these studies must be added instruction in such subjects as possess a particular value to a local industry or industries. The commercial continuation schools distinguish themselves from the general industrial continuation schools in that they emphasize the commercial studies, viz, correspondence, bookkeeping, languages, commercial arithmetic, commercial geography, and office work.

It is important to note that the child first comes in contact with the system of industrial education after graduation from the Volksschule. In some States it is permissible to substitute a special trade school (gewerbliche Fachschule) for a continuation school, particularly for persons preparing for a profession. Furthermore, a primary commercial school, a primary textile school, or school for mechanics, or for locksmiths, etc., may be substituted for the continuation school. As a rule, however, these special trade schools, even if elementary, require the completion of some continuation school for admission, to insure proper maturity of mind in the study of a profession.

Here, then, is the end of the educational career of a child destined for nothing more than a primary education. The Volksschule course, plus a compulsory, or rarely optional, continuation school course, or, in substitution, some industrial continuation or trade school course, is the sum total of a primary education in Germany, which is completed at the age of 15, 16, or at times 17 years, according to the time prescribed for attendance at the continuation school. It must be borne in mind that the continuation schools, as well as all the elementary trade schools, are evening schools, enabling the young boy or girl to get an education while earning a living during the daytime. The completion of the evening school cuts the last bond of his educational career, except in rare cases when a specially ambitious young man takes such opportunity as may offer to attend a more advanced evening school later on in his career, such as a masters' school (Meisterschule or Meisterkursus), in which the masters of a trade gather to discuss the more advanced phases of their profession.

SECONDARY EDUCATION.

The "höhere Schule."—The secondary institutions of learning in Germany are generally distinguished from the primary and the higher schools by having the adjective "höhere" prefixed to the name of

the school, just as the prefix "hoch" indicates a higher institution of learning. Thus a "Handelsschule" is a primary commercial school, ranking with and resembling the commercial continuation schools (kaufmännische Fortbildungsschule); a "höhere Handelsschule" is a secondary or "higher" commercial school, and a "Handelshochschule" is a commercial high school, ranking with the higher institutions of learning, like the technical high schools and universities. Thus, also, in the system of general education, a "höhere Knabenschule" is a secondary school for boys, and a "höhere Mädchenschule" is a secondary school for girls.

The effect of military privilege on secondary education.—A word is necessary, at the outset, in regard to the peculiar influence exercised by a military regulation of the country upon secondary education. Provision has been made by the army organization that all German youths who have successfully completed a course in a six-year secondary school, or six years of work in a nine-year secondary school, shall be honored with the privilege of one year's military service as a volunteer, instead of a service of two, or, in certain cases, three years of regular service; and in addition shall have opened up to him an opportunity to become an officer in the German army. The desire to acquire this privilege undoubtedly induces large numbers of young men, as well as their hopeful parents or advisers, to make great financial sacrifices in order to secure the completion of six years of work in a secondary school. This qualification having been attained, it is a much deplored fact that large numbers of students withdraw from nine-year schools without completing their work—which only too plainly demonstrates the real aim in this secondary study. Yet this provision can not but be designated as an extremely politic and wise means of raising the educational standard of the people, and of supplying a large choice of mentally well-equipped young men from whom to recruit the lower ranks of army officers.

Classes of secondary schools.—At the attainment of the tenth year the child destined for a better education, either secondary or higher, enters some secondary school. These schools are either classical, semiclassical, or nonclassical, according as both Greek and Latin are taught (classical), or but Latin (semiclassical), or neither Latin nor Greek, modern languages taking their places (nonclassical). These secondary schools may have either nine-year or six-year courses. The nine-year schools are called Gymnasien (classical), Realgymnasien (semiclassical), and Ober-Realschulen (nonclassical). The six-year schools are called Progymnasien (classical), Real-Progymnasien (semiclassical), and Realschulen (nonclassical).

The Realschulen.—The Realschulen are of comparatively recent development, their history going back only about half a century. Their rise was contemporaneous with the commercial movement in Germany, and they have experienced their greatest development, as have German commerce and industry, during the last few decades. Though bitterly opposed by an unreasonable and fanatical prejudice on the part of the philosophical adherents of the ancient classics, these schools, on the sheer strength of their merits, have won their way to the front, aided, also, in no mean degree by the farsighted and broad-minded commercial policy of the present Emperor, who has bestowed on them his unconcealed favor. To-day they offer an excellent opportunity for a broad and practical education as a foundation for a business

career. It follows from this that the young man who seeks to enter some commercial or industrial career, or who intends to complete his education in some industrial high school, will attend in his tenth year, as a rule, a secondary nonclassical school, either the Ober-Realschule or the Realschule.

Secondary education as an end.—If the means at the disposition of the student are limited and he must end his educational career in the secondary schools, he has three general courses open to him. He may enter some secondary trade school, usually with a three or four year or, less frequently, with a two-year course. He may choose a six-year course in a Realschule or Real-Progymnasium, or Progymnasium. Or, if he can afford a longer course, he may enter a nine-year school. Since a lack of funds to secure an advanced education generally implies a necessity to earn one's own livelihood, the father or adviser, if he is wise, will probably send the son to a special trade school of secondary rank, or to a Realschule or Ober-Realschule instead of permitting him to cram into his head what to him are useless rudiments of Greek or Latin.

Since the "real" schools are not industrial schools in the true sense of the term, but supply rather a practical preparation for an industrial career, it follows that the German system of industrial secondary education, in which we are particularly interested, touches the system of general secondary education solely through the secondary trade schools (*höhere gewerbliche Schulen*), such as the higher schools for the textile industry (*höhere Schulen für Textil-Industrie*), higher engineering schools (*höhere Maschinenbauschulen*), higher institutes of technology (*höhere Technika*), higher commercial schools (*höhere Handelsschulen*), etc.

Final education for women.—Attention may here be called to the fact that the secondary schools, as a rule, close the educational career of German girls, though to-day sentiment is rapidly growing in favor of their admission into the higher institutions of learning, which in a number of instances has already been accomplished. In the universities they are generally admitted as "Hörer," if not as full students, in which case they are privileged to attend prescribed courses of lectures. The same is true of technical high schools, where courses like economics, history, industrial art, etc., are open to women. Since the girls who attend secondary schools are compelled to prepare themselves for some industrial occupation much less frequently than are the boys, more of them attend classical or semiclassical schools than "real" schools or secondary industrial schools. However, as will be seen, Germany has already made considerable provision for secondary industrial schools for girls (*höhere gewerbliche Schulen für Mädchen*), and is to-day busily engaged in increasing their number.

Secondary education as a preparation for higher education.—If the boy of 10 is destined for a higher education he has two general classes of schools open to him—the schools with nine-year and those with six-year courses, and he may choose either a classical, semiclassical, or nonclassical course. During the earlier years of the nonclassical "real" schools prejudice in favor of the classics and a solicitude for the prestige of the higher professions of medicine, law, and theology withheld from the nonclassical institutions the privilege of being preparatory schools for these professions. But with the rise of modern commercialism and the revolt of public opinion in favor of a practical

education the "real" or scientific schools forced from the State one after another the privilege of being numbered among the preparatory schools for law and medicine, and in some cases also for theology. Since by mature theology calls for a classical preparation, the latter privilege, where granted, was merely a nominal recognition of no importance.

If a boy of 10 and his advisers dream of theology, the boy will very likely enter a classical or semiclassical school with a nine-year course. If he looks forward to law or medicine, he will probably select a semiclassical or nonclassical school. If he anticipates an industrial or commercial career, as manufacturer or merchant, he undoubtedly, in the great majority of cases, chooses an Ober-Realschule or Realschule as a preparation for a higher education in some industrial high school. Whether in the latter event a nine-year or a six-year course is chosen will depend upon the adviser's ideal of an industrial education. Some contend that the boy must needs come in contact with active business life while receiving his industrial education, and not be totally confined to his books until he has completed his entire educational preparation. Those who entertain such a conviction will send their sons to a six-year-course Realschule, and after graduation, when he is about 16 years old, will have him go out into business for two or three years, frequently to complete a period of apprenticeship in some profession, and then send him to an industrial high school to crown his preparation. In recognition of this practice the industrial high schools have almost universally provided in their entrance requirements that graduates of a secondary school giving a six-year course shall, in addition, have completed a period of apprenticeship or have had several years of practical experience in some business. If the advantages of an intermediate brief practical career have not been had, the boy who is bound for a higher industrial education must needs attend a nine-year course school—that is, an Ober-Realschule, or, less frequently, a Realgymnasium or a Gymnasium.

HIGHER EDUCATION.

The average age of the student who begins work in some higher institution of learning is probably 19 or 20 years. The student who contemplates entering the medical, legal, or theological profession, or who desires to follow some higher intellectual pursuit, enters the proper department in some German university, after having passed through some secondary school, as already indicated. Young men who are aiming at an industrial career to fit them for the ranks of miners, merchants, chemists, architects, engineers, scientific agriculturists, or Government officials, enter some industrial high school, such as a mining academy, commercial high school, or technical high school. The technical high schools invariably contain a number of closely correlated departments, such as departments for architecture, engineering, machine building, electrotechnics, chemistry, general science, etc. The student here specializes in his profession. Up to this time the student has been preparing himself for a professional education, in that he has laid a broad foundation of general practical knowledge—the great mission of the Realschule. During every day of his work in the commercial high school or the technical high school the student is putting on the best armor that modern professional education can provide, and is receiving the benefit of instruction in the most advanced technical thought that science and persistent application have developed.

SUMMARY.

A cursory view of the entire system of education in Germany, as presented in a general type, has now been completed, and we are ready to begin a study of the system of industrial education in particular. In conclusion, a word may be said on the points of contact of the general system of education with the system of industrial education.

Joined to the general primary schools are the general industrial continuation schools, the commercial continuation schools, and the countless lower trade schools, such as the schools for locksmiths, blacksmiths, butchers, shoemakers, toymakers, millers, gardeners, dyers, bookbinders, printers, textile workers, woodworkers, mechanics, plumbers, druggists, clockmakers, etc., though some schools teaching these trades and callings offer advanced work of a secondary rank.

Joined to the general secondary schools are all the "higher" industrial schools (*hoehere gewerbliche Schulen*), such as the higher textile schools (*hoehere Textil-Schulen*), higher commercial schools (*hoehere Handelsschulen*), higher engineering schools (*hoehere Maschinenbauschulen*), higher institutes of technology (*hoehere Technika*), etc. Practical industrial experience is also introduced as an intermediate three years between the six-year *realschule* and entry in some industrial high school.

Finally, side by side with the universities stand the great industrial high schools, the commercial, agricultural, and technical high schools, the schools of the future. These are the present peers and future rivals of the institutions of ancient classicism in Germany—rivals, but obviously not destroyers; rivals, because they will attract a large share of public favor, but not destroyers, because the classics are essentially the indispensable leaven of the highest culture in modern civilization, an integral part of every cultivated people's education.

2. EVOLUTION OF GERMAN INDUSTRIAL SCHOOLS.

Industrial education is the youngest branch of modern education. It presents also, and largely for this reason, the crudest, most unorganized, and most experimental form of our modern mental and manual discipline. Its exact origin is necessarily difficult to determine, since, being an evolution of the times, it is quite closely associated with that which preceded it. In the seventeenth and the beginning of the eighteenth centuries the value of a practical training became more largely recognized than formerly, and the first prominent, though imperfect and incomplete, industrial schools were established. France took the lead in this movement. Her veteran educator, Colbert, who believed most devoutly in the value of first training the mind so that it might be useful to the hand, and then not failing to train the hand so that it might be useful to the mind, was a capable apostle of the new practical business discipline.

Industrial education is the complement of general education. Whereas general education supplies the power to read with understanding, to think with clearness, to reason with accuracy, and to act with intelligence, industrial education supplies the power to read a trade paper with understanding, to think about a trade condition with clearness, to reason about a trade crisis with accuracy, and to act in a trade situation with intelligence. General education tells us where we may expect gold to lie. Industrial education tells us how to sink the shaft, to wash the sand, and to recognize the nugget. One deals with books; the other with life. One concerns itself with principles and theory; the other with practice and application. Neither is complete without the other. But general education is fundamental to industrial education, as is the soil to the harvest, and for this reason is naturally and necessarily developed first.

It was when our modern era of prosperity was being ushered in by the great political, social, and industrial revolutions of the seventeenth and eighteenth centuries, when men were developing a broader view of and a deeper insight into the life of the day, that industrial education had its birth. The necessities of a rapidly evolving industrial life suggested the value of a special trade education in schools established for this sole purpose, in place of the then existing fundamentally good but practically inadequate system of apprenticeship, under which the boy learned to do by working in his master's shop. This was, as history proves, a good method only so long as the master had time to teach the apprentice and the apprentice had time enough to spare to learn all about the trade. But the day soon came when the master was so busy maintaining himself against the competition of others and keeping up with the technical advancement of his trade that time failed him for the instruction of his apprentice, while the apprentice found that the trade had developed such a many-sidedness and such complexity that he could no longer learn its fundamentals by mere

activity in his master's workshop. There was time enough neither to teach nor to learn. Teaching and learning had to be done in some other place and at some other time. Where could it better be done than in a meeting of all the apprentices with teachers to instruct—in other words, in a school? When could meetings or schools best be held but outside of working hours, namely, in the evenings and on Sundays?

Thus in the first stages of the evolution of industrial education we meet evening schools and Sunday schools, and these still survive in manifold forms and in numerous stages of development. Work in these schools, especially during the earlier stages of their development, lacked thoroughness. Their curriculums were not solely confined to industrial subjects, and in many cases were but secondarily devoted to them. They presented a mixture of studies for a general education, intended as a rounding-off of the common school education, and of practical subjects of trade and occupation. In addition to being taught how to weave, build, and design, students occupied themselves even with the fundamental disciplines, reading and writing, and, in numerous instances, with religion as well. In fact, the earliest Sunday schools devoted their entire curriculums to general education. Instruction was, as a rule, offered for several hours on Sunday afternoons. Compulsory attendance up to the age of 16 or 18, and even up to the day of marriage, was in some cases introduced, but its enforcement proved impracticable, because of the lack of proper rooms and of a sufficient number of teachers. The practical results were seldom satisfactory, because of the meagerness and irregularity of attendance, the diversity in age of the students, the dissimilarity in their preparatory training (or even its absence), the incompetency of the teachers, the lack of appropriate school-room equipment, and other unpropitious circumstances too numerous for mention.

In this early period of Sunday and evening schools the first signs of modern German professional trade schools were also found in the form of "drawing schools," "merchant schools," "trade schools," "commercial schools," "mechanical schools," "art schools," etc., which slowly differentiated themselves from the ordinary Sunday school through emphasis of instruction upon some particular industrial occupation, and the elimination of those general educational features which were inconsistent with and detrimental to the professional character of the schools.

Another step in the evolution of Germany's present industrial and general educational system is found in the so-called "real" schools, which attempted, even in their earlier stages, to combine general and industrial education in a single institution, through the association of certain special trade courses designed for the practical study of an occupation with its general courses of instruction. The general tendency and aim of these "real" schools was toward a distinctly modern and highly practical education. The first example of these institutions is found in the short-lived Mathematical and Mechanical Real School, founded by Christoph Semler, at Halle, in the beginning of the eighteenth century, and in the Real School of Berlin, established by Johann Julius Hecker in the middle of the eighteenth century. The latter aroused much interest in its day, but was destined to go down soon after the death of its founder in 1768, because of the pedagogical impossibilities which it attempted to maintain in its curriculum.

A universal school of this kind, which strove to offer instruction in everything and to everybody, including the "learned man," the official, the mechanic, the merchant, the miner, and the agriculturist, had many tempting appearances, but tried to accomplish the impossible. The times had grown too big and many sided for such institutions.

The rapid advancement in civilization and culture which characterized the entire eighteenth century called for specialized and concentrated instruction confined to clearly defined and properly limited fields. The great advances in technology and the ever-increasing taste of the public for the products of fine and skilled labor called for specialized trade schools. In addition to this the rapidly increasing keenness in competition also demanded a more thorough trade knowledge and higher technical skill. As a result of the extraordinary progress in the improvement of means of communication and the development of facilities for transportation, whereby nations, instead of localities, became immediate competitors, and foreigners, instead of neighbors, underbid each other in the markets of the world, commodities hitherto almost a monopoly became world property. In the war of competition which ensued, the man with the most thorough knowledge of his trade won. No country probably more than Germany recognized the value—in her case the necessity—of thorough industrial and technical schools for the education of her youth in the arts of commerce and industry.

The development of the German industrial schools was, however, greatly retarded during the close of the eighteenth and the beginning of the nineteenth centuries because of the numerous exhausting internal and foreign conflicts into which the country was repeatedly plunged. These military struggles drained her finances and despoiled her of her resources and her men. It must be remembered that the Germany of 1830 was not the Germany of to-day—one firm and patriotic people rallying around a common flag. The sums that could be spared for the cause of education and culture during this period of chronic war were generally unpromisingly small, while after their expenditure in the erection and equipment of schools the ravages of war not infrequently left little trace of these expenditures. Moreover, it was the institutions for the dissemination of a general education among the people that necessarily and wisely were established and fostered first of all, in preference to the industrial schools.

Another element that retarded the development of the industrial schools of the German States was the extreme decentralization of their administration. The country was but a loosely jointed confederacy, and the administration of the industrial school system was, as it is to-day, entirely in the hands of the principalities and kingdoms. While this system of administration is conducive to rivalry and competition in the establishment and promotion of industrial schools between the various members of the present Empire, it has not yielded the results that a unified and centralized control and supervision might have achieved. There is no uniformity in the system, and there exists no opportunity for a general and systematic application of the educational resources of the entire Empire to the advancement of professional trade and technical education, the need of which is common and of equal importance to all parts of the country.

This tendency toward a local and dissimilar development of the industrial schools of Germany, which is probably to be deplored, is

to some extent neutralized through the efforts of the three great German associations for the promotion of industrial education, namely, the Association of German Industrial School Men, the German Association for Higher Education, and the German Association for Commercial Education. These organizations have a large membership throughout the Empire; their publications are sent out to all parts of the land; they assemble from year to year in different parts of the country; their members stream together from north, east, south, and west to exchange ideas, compare experiences, criticise, suggest, and resolve. These strong unifying influences tend to counteract the decentralized administration, and give to the whole system of German industrial schools a general aim and to some extent a general complexion.

After the unification of the German Empire in 1871 the progress in industrial education was quite as extraordinary as in every other branch of life. Peace, patriotism, and a consciousness of national greatness were a stimulus that worked wonders in the brief space of a few decades. Thought could now, after years of apprehension for the safety of the land, be turned with confidence from politics to trade. United Germany faced a new situation. Though political peace may envelop the world, industrial wars never cease. With an almost instinctive feeling that knowledge is power no less among nations than among men, and no less among business men than among the learned of the world, Germany now turned to the development of her industry and of her commerce through the promotion of her industrial and commercial education. The idea in the Kaiser's watchword, "The future of the German Empire lies on the seas," though it was uttered years later, even then lived in the consciousness of the people. Everywhere principalities, cities, associations, and private benefactors fostered the establishment and development of industrial and commercial schools. The old time Sunday and evening schools, which in the course of the last half century had been slowly falling to pieces, only to be rebuilt into more practical institutions which specialized for given trades and occupations, were further remodeled, and, developing into two great classes, the trade or industrial schools proper and the commercial schools, each branch of which again divided and subdivided into manifold institutions with professional trade curriculums, ultimately grew into the complex and thorough system of industrial education which to-day ranks as the best that can be offered in any country.

It is probably true that Germany's present technical high schools and lower and middle trade schools developed out of the early trade schools which in the first half of the nineteenth century arose as outgrowths of the general Sunday schools through the extension and perfection of the specialized curriculums, the increase of the hours of instruction, and their transfer from Sundays to week days, the engagement of more competent teachers, and especially the application of greatly increased sums of money.

While an attempt has herein been made to treat of the evolution of the German industrial schools in stages, or periods of development, it is evident that, as in case of all evolutions, the successive advances are quite closely graded into one another, and everywhere present exceptions and abnormalities. Especially is this true of industrial education, which, if it is to fulfil its great mission, must necessarily be ever in the

process of change in order to maintain its adaptation to the requirements of an ever and not infrequently capriciously changing industrial world. Just how the evolutionary process will proceed depends upon the status of culture and the scientific and industrial ripeness of the people, the industrial complexion of the region, and above all the financial means available for the promotion of industrial schools. Since the conglomerated principalities which constitute the German Empire of to-day differ more or less in one or another or all of these elements, their industrial school systems have necessarily developed prominent local characteristics, and therefore a study and comparison of these systems is extremely difficult and confusing. However, to such a study attention will next be paid.

3. INDUSTRIAL SCHOOLS AND THEIR RELATION TO INDUSTRIAL LIFE.

NECESSITY OF CLOSE RELATIONSHIP BETWEEN SCHOOLS AND LIFE.

The relation of an efficient system of schools to the life in which it exists is one of intimate reciprocity. Good schools give much from within and receive much from without. The nature and degree of this reciprocal relationship determines entirely the value of an educational system. Institutions which annually use heavy appropriations without distinct enrichment of the community that maintains them are worse than useless. They occupy space and consume resources that might profitably be devoted to better purposes. Institutions which coldly withdraw themselves from the throbbing life without and maintain themselves within their narrow shells, built for the chosen few only, may enjoy longevity by virtue of their marble halls, but can never live and grow in the hearts of the people. History bears witness to this.

The German industrial schools, however much they may have been derided and ridiculed by narrow-minded opposition in the primary stages of their development, have proven their worth, and have grown into institutions quite the opposite in character from those portrayed above. They are open, as a rule, not to a class or to a country, but to the world. In their halls rich and poor meet on equal terms as learners. They require comparatively little money, but educate thousands of hands and heads. They throb with the life about them, and grow with the world without. They are the most powerful weapons of German industry. They are the ironclads of commerce.

In the present discussion an attempt is made to show where and how in the German world of industry school and life touch each other; how this intimate relationship of education and industry was created and how it is maintained.

AGENCIES ESTABLISHING GERMAN INDUSTRIAL SCHOOLS.

The agencies through which the German industrial schools are established and fostered are of widely different character. Sometimes the creating agency is the State, sometimes a guild, sometimes an association, sometimes a commune or town, sometimes a private individual, and sometimes two or many of these combined. In general it may be said that the State participates most largely—or even exclusively—in the establishment and maintenance of those industrial institutions which aim to supply the best and highest grade of instruction, such as the great technical high schools, the commercial high schools (more properly called commercial universities, from the scope and breadth of their instruction), as well as some of the industrial art schools and large trade schools. Because of the necessity of spacious buildings, of a highly educated teaching force, and of the magnitude in organization

and management which schools of this class require if their work is to be maintained on a modern and efficient basis, the financial burden is too great to be shouldered by guilds or individuals alone, nor is there incentive for such financial undertaking. The benefits of a technical high school come to the State at large, not to any particular trade or class of people. The logical agent to come forward and establish and maintain such institutions is therefore the State. Some of these schools also owe their origin to bountiful endowments by public-spirited men of means.

Schools of lesser importance are almost invariably organized and maintained by local guilds, industrial associations, or private individuals, with occasional governmental subsidies, as is well illustrated in Saxony, Hesse, Nassau, and Darmstadt. In Baden the industrial schools are, without exception, communal or town (Gemeinde) institutions with State aid.

An enterprising statistician perceived a good opportunity at the industrial school exhibition held at Dresden in 1898 for the collection of data as to the origin of Germany's industrial schools. The greatest diversity was found to exist. The 251 industrial schools which participated in the exhibition were founded by various agencies, as follows: 48 by the State; 47 by guilds; 88 by other industrial organizations and associations; 45 by the Gemeinde, or town; 23 by private individuals.

The State promoted, in the main, the larger schools, the community the minor schools. Experience has proved the wisdom of preserving the lower industrial schools, and especially their financial administration, as nearly as possible in the hands of the local government or local trade organization. Such an arrangement draws them closely into the life and interest of the community. These schools are, as a rule, eminently local in their curriculums, their aims, and their general character. Their students come largely from among the inhabitants of the immediate vicinity. They supply skilled labor for the local industries. The consciousness of an immediate and direct financial interest and return is invigorating. It stimulates regular and full attendance and close application. It encourages the adaptation of the school to the changing needs and requirements of the locality. In brief, it keeps the school modern and alive to the call of industry.

LOCATION OF GERMAN INDUSTRIAL SCHOOLS.

The selection of the proper locality for the erection of an industrial school building has always been an important consideration in Germany, and has done much to create and maintain that intimacy and reciprocity in relationship between school and life to which reference has already been made. To be sure, a divided opinion probably never existed as to whether the weaving school ought to be located in the mining center or the mining school erected in the weaving center. But there are numerous other important considerations of expediency in the matter of location. Old records show that the German fathers had many warm discussions over the practicability of one place or another for the location of a contemplated trade school. It has also been the aim to place the school building as near as possible to the center of an industrial community, in order to give all equal chances to attend. One therefore frequently finds large and important indus-

trial schools in comparatively small cities. The metropolitan idea is inconsequential in face of the call of industry. This location of the schools affords easy access to the neighboring factories and workshops as a practical supplement to the work in the school. When it is remembered that almost all trade schools have special workshops or factories associated with the school building, it will be seen that the student during no moment of the period of his learning loses contact with the peculiarities of the industrial life in the surroundings of which he must later on work out his salvation. Obviously the question of location is vital only to the specialized trade schools and the commercial schools located in leading commercial centers and has little application to the great German technical high schools.

CHARACTER OF THE STUDENTS.

A very large majority of the students who attend the trade schools of Germany have had more or less preliminary training and practical experience in the trades in which they desire to perfect themselves. They come directly from the industries, and with the power of a wider knowledge of the new and latest developments in their trade go back to them to bear witness to the wisdom of industrial schools by proving their strength and capacity as competitors in the world's markets. Industrial education needs a good soil if it is to flourish. The previous training, the foundation, both mental and practical, is half the making of the technologist. Entrance requirements in most of the professional trade schools emphasize the necessity of previous practical employment in the industry in which the students desire to perfect themselves. The length of time of previous active preparatory work required and the maturity of mind depends upon the difficulty of the trade and upon the grade and character of work offered in the school, and varies from several months to one year and more. Compulsory attendance, which will be treated more at length in a later paper, is quite general in Germany. The young boy is given the choice of continuing his studies at the compulsory schools for general education or of entering an industrial school. This excludes the possibility of "cutting" an education. Since no young man, if he is sensible, will for an extended period of time engage in the study of an industry in which he does not intend to specialize, all who enter an industrial school are there for a purpose and with a clear idea of what they are about. No useless chaff finds its way into the study rooms, and the teachers are obliged to deal with none but genuine wheat. Such students are an encouragement to the teachers and an inspiration to each other. A visit to a trade school, with its intent learners, forcibly impresses one with the value of such a community of interest in giving an impetus to education and an incentive to vigorous competition, both of which are signally fundamental to industrial success.

CURRICULUMS AND METHODS OF INSTRUCTION.

While the curriculums and methods of instruction will be treated more thoroughly and in detailed concrete form later on, they can not be overlooked here. They are the most important features of the school, and merit the most careful consideration. The curriculum and the method of applying it determine the success or failure of a school. Though German critics see room for much improvement in the cur-

riculums of industrial schools, it is manifest from the success of the young graduates that they are already quite well adapted to the needs of the day. While a varying amount of general instruction must be given, and a foundation of the theoretical side of a trade laid, practical instruction and active work in associated factories or workshops preponderate. Here lies the secret of a large part of the Empire's success. Such instruction is inestimably more valuable than to "learn to do by doing" in a father's or somebody else's factory, where a young man is merely an apprentice, standing largely upon his own uncertain feet. In the modern German trade school are found the most modern machines, the latest inventions, and the most practicable methods. Every movement of the student is guarded, every act is followed, every mistake is corrected as soon as it happens by teachers who have had good preparatory training, who, in most cases, come directly from their trade, and who are fresh and up to date in their practice.¹

How different the situation of the young apprentice in his father's factory. He may be alone at his machine for hours at a time. He may commit a legion of errors without detection until the products of his experimentation are placed upon the market, as experience has frequently proved. He may have a negligent father; he may be trying to learn in an antiquated factory, with old-fashioned machinery and antique methods; he will very likely imitate his father, who may have imitated the methods of his grandfather. In contrast to this, what a wealth of opportunity is furnished in the modern workshop associated with a technical or trade school. Here the student may revel in the surroundings of the latest and best. He knows that he is arming himself with the keenest sword and is protecting himself with the most effective armor. It was the value of this practical work in the workshop of the school that was most generally questioned by the strongest opponents of the German industrial schools. It was this idea of bringing the spinning mill and the loom, the plow and the harrow, the steam engine and the locomotive under the hood of the doctor of philosophy and under the protecting arm of the forgetful, idealistic, and unpractical professor that the enemies of industrial schools in Germany ridiculed and derided. But their gibes and sneers missed their mark. The progress of industrial education has borne eloquent witness to the need of it. The success of its scions in industry are daily vindicating it. The overcrowded recitation rooms and the rejected demands for admission are evidence that the people are calling for it. It is a victory of instruction in the teachers' factory over apprenticeship in the father's factory.

A few words more as to the curriculum. Drawing is preeminently in the lead. It lies at the basis of a large majority of advanced studies and is the A B C in the curriculum of many a trade school. As a former United States consul at Chemnitz, Mr. Monaghan, well says, in his reports on industrial schools in Germany:^a

The importance of this study may be seen in the many hours devoted to it, from the kindergarten to the university. No other study in technical schools gets so many hours or more careful attention. In day schools, evening schools, and Sunday schools it is the same thing—drawing! drawing! drawing! It is an aid rather than an injury to the memory. It trains the mind as well as the eye. It is as great an aid to the reasoning powers as is logic or mathematics. It is the very essence of both. One is always dealing with relations, making comparisons, seeking exactness. Besides, a sense of the harmonious and beautiful is developed.

^a Published in Consular Reports for August, 1894, March, 1895, and at frequent intervals.

In mathematics, as in other studies, it is assumed that the student has grasped the fundamentals of the subject. Emphasis is placed upon accuracy, speed, and simplicity. Most of the hours in arithmetic are devoted to technical computations, which are incidental to the special trade taught in the school. In geometry theoretical demonstrations give way entirely to practical applications of geometrical relations. What requires special attention here is that in the German trade schools work does not end with the purely technical side of the trade, which would place the graduate at the mercy of his inborn talent (or lack of it) for wise business management, but includes studies which prepare the student for the practical conduct of a business. He gets a good knowledge of production and consumption, cost, prices, and market fluctuations in his trade; he learns the system of bookkeeping which is most practical in his business; he studies public legislation of importance to the industry with which he has identified himself; and, on the whole, he is given opportunity to acquire a good insight into concrete business relations and trade practice.

While undoubtedly the German schools try their best to get all the good things they can into their curriculums, and then get the best possible teachers to instill them into the learners, the problem that calls for solution is a difficult one. It is no reflection to say that it is not always successfully solved. The material in their hands is too uncertain, too heterogeneous. Young men of a wide dissimilarity in preparatory training attempt one and the same group of studies. Eminent critics concede a quite common failure to take into proper consideration these widely varying qualifications of the students. Other occasional deficiencies that may be enumerated are lack of a thorough practical knowledge among the instructional force, a too theoretical training, and an attempt to crowd too much into too few hours. The student is frequently fed too much on prepared foods, instead of being compelled to observe, gather, judge, eat, and digest for himself on his individual responsibility and risk.

TIME OF INSTRUCTION.

One of the greatest difficulties encountered by the German industrial schools of lower rank, including the many weaving, knitting, dyeing, and finishing schools, the schools for tin workers and rope makers, the numerous lower schools for machine building, etc., is to find convenient time for instruction—time which does not interfere with the earning hours of the students, for it must be remembered that a very large proportion of the students attending the minor schools are compelled to earn a living simultaneously with their work in the school. Education as offered in the numerous smaller trade schools scattered throughout the Empire and located in the heart of the particular industry which they teach, must not be confused with that obtained at the great technical high schools and commercial colleges (*Handelshochschulen*, literally translated, commercial high schools), in which the student devotes his entire time to study, or at least has no daily employment to mar his application to intellectual work. The higher industrial schools with the three and four year courses, heavy expenses, and difficult entrance requirements necessarily exist for purpose of fitting a comparatively small number of the German youths for a career as the most advanced technologists. In these the question of time of

instruction need not be considered. These schools require all the time that the brightest student has at his disposal. Some of them provide for special studies in evening courses; but such courses are entirely independent of the institution. They might to all intents and purposes be conducted in any other city and under the supervision of any other instructors. They are purely evening schools for supplementary training in some particular branch of technology. The fact that credit for work done in these schools may be given in the higher schools with which they are associated—that is, associated by proximity—does not change their character. It is in the professional trade schools of all classes that the time of instruction is a difficult question, for probably a great majority of those who attend the lower industrial schools lack sufficient means to devote from six months to several years to the learning of a trade. If therefore these schools are to prosper and fulfill their mission, they must recognize this fact and select periods of instruction when attendance is most convenient. Such periods obviously must fall outside of the regular daily working hours, namely, on Sundays and in the evening.

The evening school problem is a real bane to industrial education, and is not confined to any one country or people, but is common to the world. It is inherent in no particular system, but finds its origin in an unavoidable condition of life. It is unfortunate, but apparently irremediable. It has received the close attention and earnest thought of the most enthusiastic and conscientious promoters of the new education. It has very likely come to stay. Not until we enjoy a universal prosperity can opportunities of education be open equally to all. The disadvantages of evening schools are numerous, and are easily patent to any interested observer. Intellectual application on Sundays or in the evening, when the body is exhausted with a day or week of physical employment, leads to overexertion, and is apt to arouse a feeling of repulsion in the learner toward the study which robs him of well-earned repose. It has also been suggested that Sunday study of industrial subjects interferes with church work, and leads to a neglect of religion and higher moral thinking. Furthermore, even at best, evenings and Sundays together offer too few hours for proper, systematic instruction.

In certain groups of industrial schools the apparently unavoidable evil of Sunday and evening instruction has been largely overcome, not, however, without considerable sacrifices on the part of some who had wished to attend. The most favorable showing is probably made by the commercial schools of all classes. These institutions draw their students from a comparatively prosperous class of merchants, manufacturers, and wholesale dealers, where the means are at hand to send the young men away from home to occupy themselves entirely with their studies. Out of 47 commercial schools which in 1899 offered 3,321 hours of study a week, only 8 hours were reported as falling on Sundays or in the evenings.

In case of the industrial schools of Saxony, statistics show that, in 1899, 35 per cent of the total number of hours of instruction fell on Sundays, 53 per cent fell on week-day evenings, and the rest came during the week in the daytime. This does not include the smallest trade schools, which would considerably raise the already high percentage of evening and Sunday instruction. Baden presents more favorable conditions. As far back as July 16, 1868, a law was enacted in Baden under which but two out of the six hours a week prescribed

by law for each class or subject might fall on Sunday. As a result Baden had, in 1889, but 1.6 per cent of its hours of instruction on Sundays, 5.9 per cent in the evenings, and in summer as high as 98 per cent in the daytime. In opposition to this, 46 of the 186, or 24 per cent, of the Prussian merchant schools existing in 1898 offered instruction on Sundays, and many of them at hours between 3 and 7 o'clock in the afternoon. In Württemberg 15 per cent of the hours of instruction fell on Sundays in 1899. In Switzerland 17 per cent of the hours of study fall on Sundays and 49 per cent on week-day evenings.

Other important considerations which hinder reform in the direction of a reduction of the number of hours of evening and Sunday instruction are the difficulty of obtaining rooms for assemblage and teachers for instruction. The teachers in the lower industrial schools are in many instances engaged in industrial occupations related to their subjects, or teach in the public schools. The expense of hiring teachers for instruction in the industrial schools alone would be entirely too heavy, so that the above arrangement is the only one that has been found practicable if a proper standard of instruction is to be maintained.

In many cases, also, the industrial schools meet in rooms which are occupied during the day by some business, or for other instruction, as is the case where public school buildings are placed at the disposal of the directors of industrial schools. To be sure, only the smaller industrial schools encounter these difficulties of teachers and rooms. The higher technical institutions and commercial universities disseminate industrial education in elaborate, modern, and in many cases palatial structures. A lack of means has frequently led to accommodation in poor rooms with unadapted tables and inauspicious surroundings. In Baden the outlook is quite favorable in this respect, as 85 per cent of the more advanced industrial schools occupy independent rooms for instruction.

FINANCIAL SUPPORT.

At the bottom of all questions of administration is the hard fact of money. Nothing is of more determining importance than the finances of an institution. They fix largely its scope, breadth, and efficiency. A lack of resources means failure, no matter how laudable the aims of a school. Give a school money and unfailing resources and it will prosper long under the most untoward circumstances. German industrial schools are usually compelled to exercise the closest economy, and in many cases they suffer for want of adequate support. The lower schools, which necessarily are the most numerous, frequently lack proper rooms for the meeting of students, sufficient funds for the engagement of good teachers, and means wherewith to purchase the most essential schoolroom equipments. Their financial administration is an unending chapter of struggle. Their great number in certain parts of the Empire has dissipated energy, divided interest, and reduced support. The writer believes that too often guilds, other trade organizations, and individuals, instead of uniting for the maintenance of a smaller number of efficient schools, direct their enthusiasm and devote their funds to the establishment of numerous little local schools, which, while they undoubtedly are valuable institutions and do much good, can probably not accomplish the results that could be attained through the unification of effort and resources for the support of larger institutions endowed with sufficient resources, equipped

with adequate schoolroom appliances, and administered under the numerous advantages incident to operations conducted upon a large scale. This criticism is not directed against the wisdom of maintaining certain small industrial schools for the reenforcement of local industries, but is aimed more directly at trade schools, such as are found in the textile industry, which frequently duplicate each other in one and the same town.

The financial administration of a school can obviously not be clearly set apart from its general administration, as the former is a necessary element of the latter. Since the subject of the general supervision and administration of the German industrial schools will be treated in a separate paper and will involve the expenditures of the schools, the present discussion will be confined to their incomes—to the classes and sources of income and the methods of maintaining and expanding it.

The incomes of German industrial schools may be conveniently grouped under two heads—internal incomes and external incomes. The former represent the direct earnings of the schools in the form of tuition fees, entrance fees, and receipts from the sale of products manufactured in the schools and of materials to the students of the institution. The latter represent the financial aid and support given to the schools by the numerous outside agencies, such as the State, city, town, guild, trade organization, chamber of commerce, or individual. Numerous are the agencies that establish and promote the German industrial schools, and numerous are the sources of income. Powers both weak and mighty shape the destinies of these promising institutions, all struggling individually or cooperating for a common end—industrial success and supremacy. A good illustration of the external income of industrial schools is furnished by the industrial schools of Berlin, which in 1896 had an attendance of 19,120 students and received financial aid amounting to 437,087 marks (\$104,026) from the following sources: from the city of Berlin, 329,363 marks (\$78,388); from the Prussian Government, 86,089 marks (\$20,489); from trade associations (Vereine), 12,520 marks (\$2,980); from guilds (Innungen), 9,115 marks (\$2,169).

Whether the external or internal income of a school is the more important depends entirely upon the nature of the institution; upon the number of students who attend; upon the nature of its origin, whether State or private; upon its organization; upon the voluntary or compulsory character of the attendance, and upon numerous other considerations. In general, it is probably true that those schools which are under public management and control are supported less by their internal income, in proportion to their expenditures, than are those schools which are under private management. The external incomes, in the form of subsidies, contributions, endowments, etc., are generally much larger than the receipts from tuition fees, entrance fees, and the sale of manufactured products of trade schools. There are some schools, however, whose worth has been so generally recognized, which draw so large a number of students, and which are able to maintain such comparatively high tuition fees that their entire expenditures are practically met out of their internal receipts. A good illustration is found in the commercial schools of Saxony, which, under very economical administration, manage to defray 81 per cent of their expenses out of the receipts from tuition fees. It is sometimes claimed that the German commercial schools maintain the highest tuition fees, but this is contradicted by a subsequent table (page 27).

Experience in Germany apparently goes to show that, as a rule, those schools which are under private management exact the highest tuition fees, and are the most inefficient. They are generally charged with being mercenary in their aims and administration. They are said to be too much money-making institutions, and too little agencies for trade education. Books and other materials needed by students in such institutions can frequently be obtained from the school management alone, and only at very high prices. For the sake of economy, poorly paid and consequently more or less inefficient teachers are engaged, and the institutions are managed like business enterprises conducted on a nearsighted basis, in which success is construed to mean the drawing of the largest profit from the smallest expenditure. Wisdom and worth are sacrificed upon the altar of Mammon. However, private industrial schools in Germany are comparatively rare, and it would undoubtedly be very unfair to contend that all private schools pursue narrow, mercenary policies.

Schools such as those discussed above must not be confused with schools promoted and managed by guilds or other trade organizations, as these are really under public management. The expression "public" is not confined to the central or its local government, but includes all public corporate bodies. The schools under private management are managed and administered by an individual for an individual, or by a firm for a firm. Those under public management and administration are conducted by the State through its central or local organs, or by some corporate body, as a guild, trade association, or chamber of commerce. Manifestly a trade organization does not embark upon a policy of establishing and managing trade schools for the sake of financial returns, but does so in order to promote its trade by offering the best instruction that can be given in the latest advances of the trade. Schools under such management may restrict attendance to those who are members of the guild or trade organization, or they may exact higher tuition fees from nonresidents of the locality, for very just reasons, but in other respects they assume the character of public schools established, maintained, and managed by the State. These schools are reported to have been successfully managed, as a rule, for the public weal, testimony of which is found in the very common subsidies and contributions made by the State and local governments to schools of this character. Not infrequently the State exercises a general control over the organization and management of guild schools through the submission of conditions which must be fulfilled by the school prior to the appropriation of any subsidy for its support. In Prussia, for example, a premium was placed upon compulsory attendance, and schools which enforced it were favored with certain liberal subventions.

The various agencies which give their support to industrial schools are very frequently represented in the managing board of directors in the same way as they appear as contributors to the school funds. A fitting illustration of such diverse representation in the management of a school is found in the case of the noted higher school for textile industry of Aix la Chapelle. In this institution the board of directors is called the Kuratorium, and consists of twelve members. One of these, the Regierungs-Assessor, represents the Prussian Government. Another, the mayor, represents the city of Aix la Chapelle. The rest represent the local weaving union and the local union for the promotion of industry and labor. A subboard, consisting of six members of the Kuratorium and the director or immediate executive

of the school, constitute a special body, Betriebs-Ausschuss, for the supervision of the workshop associated with the school.

It is customary in the administration of the German industrial schools to exact Schulgeld or tuition fees from the students who attend. These fees are comparatively reasonable, and serve a good purpose in winnowing out for attendance those young men who have a firm determination to follow the trade which they come to learn. The exaction of Schulgeld can readily be defended on many grounds. It is distinctly a case of paying the price, a very reasonable one, and taking what one wants. One pays for what one gets, and this is what we are accustomed to do in other walks of life. Nor does the student pay the entire bill of expenses of the school. There come to his aid the State, town, city, guild, private benefactors, and others. To this extent the entire public pays for his special trade education. The Schulgeld is a common feature of the complete German educational system. From the time the 6-year-old child is trotted off with slate and pencil, the Schulgeld calls for payment. Beginning with the trifling sum of 10 pfennigs, or the popularly termed "Groschen" (2½ cents) a week for children in the country schools (Dorfschulen), it gradually rises to marks, to hundreds of marks, yes, to a thousand marks in the most advanced industrial schools of the Empire. As a rule, however, the tuition fees in the higher classes of industrial schools, like the high engineering schools and the higher technikas, or institutes of technology, range from 200 to 300 marks for citizens of the German Empire. Entire release from a tuition fee in the attendance of common schools would be by far more justifiable than in case of industrial schools. The common schools are established by the State. They exist for the State, and are open equally to all the people. The trade schools, on the other hand, are special schools in which all are not equally interested, and the benefits of which come largely to a class of people or to a locality. Those who attend such institutions, and receive their special benefits may justly be asked to pay for their privileges, as they do in other higher institutions of learning. Besides, the exaction of a tuition fee tends to impress those who derive benefit from these schools with the value of what they are getting. It also encourages attendance and studiousness, and indirectly, also, saving. In Württemberg it is reported that the industrial schools with fees have been more sought than those with free instruction. Fees were generally introduced in this principality as early as 1855. The view point of the students in their attendance is said to have changed from that of coming as a mere courtesy to the teachers to that of coming and getting what they have paid for, and getting all they can.

To overcome any possible injustice that may be inherent in the Schulgeld, through discrimination against the poor, provision is made in many schools whereby needy pupils, whose straitened circumstances are patent and open to proof, may be required to pay but part of the tuition fee, or may be relieved of it entirely by vote of the board of directors, upon presentation of satisfactory evidence in support of the claim of destitution.

In many cases the amount of the Schulgeld is not the same for all students who attend one and the same school. Generally the tuition fee is graded on the basis of citizenship and residence. Where such gradations exist foreigners pay larger fees than do citizens of the German Empire, and citizens of the kingdom or principality in which the

school is located pay less than do citizens of other parts of the Empire. Where schools are maintained by guilds or other trade organizations outsiders generally pay a larger tuition fee than do the sons of members of the organizations. The tuition fees also vary in amount with the different classes of schools, such as technical high schools, commercial high schools, engineering schools, textile schools, and other special trade schools. Contrary to the statements of some writers on this subject, who claim that the tuition fees are highest in commercial schools, the writer has found that the textile schools and the higher engineering schools exact the highest tuition fees.

The following figures show the comparative amounts of the annual tuition fees imposed by the leading schools in the various groups:

Tuition fees in German industrial schools.

Character and location of school.	Fee.		Character and location of school.	Fee.	
	Marks.	Dollars.		Marks.	Dollars.
HIGHER ENGINEERING SCHOOLS:			HIGHER INSTITUTES OF TECHNOLOGY (TECHNIKA)—Cont'd.		
Aix la Chapelle.....	75	17.85	Strelitz.....	360	85.68
Altona.....	150	35.70	Zwickau.....	260	61.88
Elberfeld-Barmen.....	150	35.70	MIDDLE CLASS TECHNICAL SCHOOLS UNDER GOVERNMENT DIRECTION:		
Breslau.....	75	17.85	Ansbach.....	20	4.76
Cologne.....	200	47.60	Augsburg.....	300	71.40
Dortmund.....	150	35.70	Chemnitz.....	100	23.80
Einbeck.....	150	35.70	Duisburg.....	60	14.28
Hagen.....	150	35.70	Gleiwitz.....	60	14.28
Posen.....	150	35.70	Goerlitz.....	60	14.28
HIGHER INSTITUTES OF TECHNOLOGY (TECHNIKA):			Hannover.....	60	14.28
Altenburg.....	260	61.88	Hildburghausen.....	220	52.36
Aschaffenburg.....	220	52.36	Holzminden.....	162	38.56
Berlin.....	320	76.16	Magdeburg.....	60	14.28
Berlin (Elektra Technikum).....	300	71.40	MIDDLE CLASS TECHNICAL SCHOOLS UNDER GOVERNMENT AND CITY DIRECTION:		
Bingen.....	240	57.12	Apolda.....	180	42.84
Coethen.....	240	57.12	Berlin.....	100	23.80
Frankenhausen.....	220	52.36	Bremen.....	150	35.70
Friedberg.....	240	57.12	Eutin.....	115	27.37
Hainichen.....	240	57.12	Gera.....	200	47.60
Ilmenau.....	240	57.12	Freiberg.....	4	.95
Lemgo.....	220	52.36	Mannheim.....	25	5.95
Limbach.....			Stadtthagen.....	200	47.60
Mannheim.....	300	71.40			
Mittweida.....	300	71.40			
Neustadt.....	220	52.36			
Stadtulza.....	220	52.36			
Sternberg.....	220	52.36			

Character and location of school.	Fee.			
	For Germans.		For foreigners.	
	Marks.	Dollars.	Marks.	Dollars.
COMMERCIAL SCHOOLS:				
Chemnitz.....	250	59.50	300	71.40
Cologne.....	250	59.50	500	119.00
Frankfort.....	150	35.70	250	59.50
Leipzig.....	80	19.04	80	19.04
Leipzig, Commercial University a—				
(a) Entrance fee.....	20	4.76	50	11.90
(b) Examination fee.....	60	14.28	100	23.80
TEXTILE SCHOOLS:				
Aix la Chapelle, Higher Textile School.....	100	23.80	500	119.00
Barmen, Higher Textile School.....	200	47.60	1,060	252.28
Berlin, Higher School for Weaving.....	60	14.28	1,000	238.00
Chemnitz, Higher School for Weaving.....	180	42.84	400	95.20
Cottbus, Higher Textile School.....	200	47.60	1,060	252.28
Crefeld, Higher Textile School.....	200	47.60	1,060	252.28
M.-Gladbach, Higher Textile School.....	200	47.60	1,060	252.28
Greiz, Weaving School.....	150	35.75	(b)	(b)
(Saxons.....)	200	47.60	(b)	(b)
(Other German.....)	60	14.28	500	119.00
Mülhausen, Textile School.....	60	14.28	200	47.60
Pauzen, Textile School.....	100	23.80	600	142.80
Münchberg, Higher School for Weaving.....	150	35.70	300	71.40
Reutlingen, Higher Textile School.....	30	7.14	250	59.50
Ronsdorf, School for Ribbon Making.....	30	7.14	250	59.50
Sommerfeld, Higher Textile School.....	200	47.60	300	71.40
Werdau i. S., Higher School for Weaving.....				

a Lecturers are paid independently.

b Not admitted.

The tuition fees in the higher engineering schools do not discriminate against foreigners, but are the same for all students. In the institutions at Cologne and Dortmund the fees for the lower courses offered are considerably less than those for the higher courses.

When, as in case of the textile schools at Barmen, Crefeld, and Cottbus, the fee is given as 1,060 marks (\$252.28), the 60 marks (\$14.28) represent a special entrance fee exacted from foreigners, and the 1,000 marks (\$238) is the regular tuition fee for foreigners. As is evident from the above, the tuition fees discriminate against foreigners only in textile and commercial schools and a few others. A small number of schools exclude foreigners entirely.

The principle of discriminating against residents of other kingdoms or principalities finds the widest application in Saxony. The statistics below, giving the annual tuition fees, show the gradation of fees for Saxons, for residents of other parts of the German Empire, and for foreigners.

Annual tuition fees in Saxon industrial schools.

School.	Saxons.		Other Germans.		Foreigners.	
	Marks.	Dollars.	Marks.	Dollars.	Marks.	Dollars.
Royal Industrial Academy, Chemnitz.....	80	19.04	150	35.70	250	59.50
Royal Builders' School, Chemnitz.....	50	11.90	100	23.80	200	47.60
Royal Engineering School, Chemnitz.....	50	11.90	100	23.80	200	47.60
Royal Dyeing School, Chemnitz.....	50	11.90	100	23.80	200	47.60
Higher School for Weaving, Werdau.....	150	35.70	200	47.60	300	71.40
School for Weaving, Greiz.....	150	35.70	200	47.60	(a)	(a)

^a Not admitted.

GOVERNMENT AID.

In Prussia the amount of money contributed by the Government for the support of industrial schools is generally more or less determined by the organization and efficiency of the school and the material aid given by the local government. The financial condition of the town (Gemeinde) is also taken into consideration. When schools enforce compulsory attendance the amount contributed is generally larger than when they do not. Resort to this condition for subsidization has been the most powerful instrument of the Prussian minister of commerce and industry in introducing compulsion into the Prussian industrial schools, especially into the primary industrial continuation schools (gewerbliche Fortbildungsschulen). In the year 1897 the Prussian Government contributed the considerable sum of 1,428,784 marks (\$340,051) for the support of 60 professional trade schools (gewerbliche Fachschulen), while the towns (Gemeinden) contributed 744,797 marks (\$177,262). In most cases the town is required to furnish the grounds and building, as well as the main equipment of the school, before subsidies are made for the running expenses. Even in case of the State institutions (Staatsanstalten) like the builders' schools (Baugewerkschulen), mechanical engineering schools (Maschinenbau-schulen), and industrial art schools (Kunst-Gewerbeschulen) the town frequently pays for a large share of the cost of construction, or even furnishes the entire building. This is probably a very wise arrangement, inasmuch as such participation in the promotion of industrial

schools is apt to arouse and to strengthen the interest of the public in the welfare of the institution.

In Bavaria the industrial continuation schools (*gewerbliche Fortbildungsschulen*) are town institutions (*Gemeinde-Anstalten*), with considerable incomes from the circles (*Kreise*) and the State. The special trade schools (*gewerbliche Fachschulen*) are in part purely State institutions and in part circle institutions with State aid. In 1899 the State paid 143,000 marks (\$34,034), the towns (*Gemeinden*) 247,000 marks (\$58,786), and the guilds and other trade organizations 20,000 marks (\$4,760) for the support of the industrial schools of Bavaria.

In Saxony no definite rule as to State aid seems to have developed, but those schools which are in need and are receiving substantial support from the towns and from the trades immediately interested (*Nächstbetheiligten*) also receive State aid. Saxony is said to have developed the principle of an active support by those who are most directly benefited and interested in the success of a school to the widest application. The *Schulgeld*, or tuition fee, has been found a very important item in the school budget in Saxony, as 81 per cent of the expenses of the commercial schools were, in 1898, met out of the receipts for tuition. Great economy is practiced in the administration of the Saxon industrial schools. It is of interest here to note that Professor Bendell, the Swiss expert on industrial education, says that the many-sided and efficient industrial school system of Saxony was maintained at the small expense of 89 francs (\$17.18) a year per student in 1894, against 126 francs (\$24.32) for the Swiss schools.

Further illustrations of the amounts contributed by the State, towns, guilds, and other trade organizations for the establishment and maintenance of industrial schools will be presented later in discussing the various important classes of industrial institutions in Germany. To one of these classes or groups of schools, the general industrial schools, or industrial continuation schools, known in the German language as *gewerbliche Fortbildungsschulen*, which are the lowest or primary schools in the system of German industrial education, attention will next be paid.

4. CLASSIFICATION OF GERMAN INDUSTRIAL SCHOOLS.

The industrial schools of Germany can be arranged in numerous groups under many heads. All have their individual peculiarities and their common characteristics. Their relationship is many-sided, and relationship is the determining element in the process of classification.

CLASSIFICATION BY ORIGIN.

The German industrial schools may be classified on the basis of origin, as public schools founded by the State, or by a town, guild, or association, and private schools founded by individuals without the support or direct control of the State. Obviously in such grouping the public schools would be found far in the ascendency in number and importance. The reason for this is patent. The State, or the town, or the guild, or the association possesses great power and large resources, and is a better-balanced business entity. The advantages of public control over the industrial schools are many, and the tendency has been more and more in the direction of a greater public influence in the management of private institutions. A very effective direction is exercised by the State, especially in Prussia, over industrial schools, whether private or managed by guilds, through the conditioning of subventions upon the observance of requirements submitted by the minister of commerce and industry, or other central authority.

CLASSIFICATION BY SEX IN ATTENDANCE.

Upon the basis of the sex admitted into the industrial schools three classes may be distinguished—industrial schools for boys, industrial schools for girls, and industrial schools for both boys and girls. Here, again, one group is far out of all proportion to the others, for the industrial world is the workshop of the boy and not the home of the girl. However, the position of woman in German industry makes her education in industrial schools probably much more important than would on first thought be suspected. When one remembers the thousands of women who work in the factories, mills, and workshops of the Empire, side by side with the men, not only the necessity of an industrial education for women, but the unfairness of excluding them from it is apparent. However, since it is necessity that drives women to manual labor of this kind, and they engage in it only to bridge over the hard time from girlhood to marriage, they turn to the school only for knowledge of the elements of the trade that is to sustain them. It is the lower schools, therefore, that the German girls attend, if they attend any. In some of these schools trials of industrial coeducation have been made with apparent success, though the idea has encountered considerable opposition. The isolation of the sexes, as will be remembered, is a distinctive feature of the entire German educational system, and the principle is very deeply rooted. Where the tests were made

it was found that the presence of the girls spurred the boys on to renewed effort.

Aside from these industrial schools with which woman comes in contact only because of the vicissitudes of poverty, there are the schools for domestic science in the true realm of woman which are scattered throughout the Empire. The work of one group of these schools, the cooking schools, can probably be accepted as a fair vindication of the boast that the path of civilization lies through the stomach. The German cook, a *persona grata* with most of those who have had the opportunity of judging her work, is ever acquiring greater skill, and is ever delving deeper into the delectable secrets of the cuisine. The present movement for the improvement of the German industrial schools is not lost upon the schools for domestic science.

CLASSIFICATION BY TIME OF INSTRUCTION.

On the basis of the time of instruction the German industrial schools may be divided into two classes—the day schools and the evening schools. Sunday schools, though “day schools,” in the sense that instruction takes place by light of day, must be classed with the evening schools, since, like the latter, they are held at a more or less undesirable time, purely to afford educational opportunities to those whose time is monopolized by earning a living during the day. While, as was seen in an earlier paper, the custom of evening and Sabbath instruction in industrial matters is quite common in all parts of the German Empire, the day schools are by far the most important in the number of hours of instruction and the scope and character of their curriculums. The aim at present is to reduce the number of hours of evening and Sunday schools to a minimum, so that the German day schools may be expected to acquire an ever-growing importance.

CLASSIFICATION BY ENTRANCE REQUIREMENTS.

THE CLASSES AND THEIR DEVELOPMENT.

On the basis of the scholarship requirements for admission and the aims in education, three general classes of schools may be distinguished: Lower industrial schools (*niedere gewerbliche Schulen*), middle industrial schools (*gewerbliche Mittelschulen*), and higher industrial schools (*höhere gewerbliche Schulen*). Each of these classes is important in its place, and performs an important mission. Each class developed because it was needed. Originally there were only the lower and the higher industrial schools. Their curriculums, however, could not meet the demands of German industry. The lower industrial schools taught too little and the higher schools taught too much. The former sent young men into the world who were not fully prepared for the task before them, who were not equipped to master the technical problems that presented themselves in their trades, while the latter claimed the time of the student for so many years that the most advantageous age for beginning work at a trade had passed. In addition to this the student found himself burdened with theoretical knowledge far beyond the needs of his calling, and absolutely worthless in the solution of the problems that came to him. A middle class of schools was required. The need grew pressing. The laws of evolution operated, and the schools were organized. The process of their growth and distribution

over the Empire is not yet complete. Parts of the country, as Prussia, need more of them, especially engineering schools. Evidence of the insufficiency of the middle industrial schools in northern Germany is found in the large number of young men from that part of the country who annually visit the Industrial Academy of Chemnitz and the Mittweida Technikum (both Saxon schools of the middle class) and take work especially in mechanical and electrical engineering. To meet this demand the number of schools of this rank in northern Germany is annually increasing.

A few words more now as to the aims, the curriculums, and the general relations of these three classes of industrial schools:

LOWER INDUSTRIAL SCHOOLS.

General character and aims.—This class of schools (niedere gewerbliche Schulen) comprises all those institutions, beginning with the lowest, or primary, industrial continuation schools (gewerbliche Fortbildungsschulen) which strive to give a general, practical, but very rudimentary, trade instruction, mainly in the evenings or on Sundays, and ending with the special trade schools which aim to teach only the most necessary technical elements of a trade. It includes all the smaller trade schools (gewerbliche Fachschulen), such as the schools for weaving, spinning, knitting, lace making, embroidery, burling, darning, rope making, basket making, tailoring, hair cutting, wood carving, clock making, masonry, architecture, ribbon making, and the numerous other special trades.

There are included also certain "courses" and "schools" which are associated with many of the special trade schools, though not an integral part of them, such as the experimental shops (Versuchsanstalten), practice courses (Übungskurse), workshops (Lehrwerkstätte), workmaster schools (Werkmeisterschulen), and others. These are auxiliary institutions. They are either complementary or supplementary. They are complementary when, as in case of the experimental shops and workshops, they are used by the students simultaneously with their studies in the professional trade schools (gewerbliche Fachschulen) as aids in grasping the practical elements of the work. They are supplementary when, as in the case of the practice courses and workmaster schools, they are used by the student after the completion of his work in the special trade school to supplement its courses and to compass the more difficult technical problems of his trade, as well as to keep him posted on its latest advances and most modern methods.

Experimental shops.—The experimental shops have been found of great value. Many special trade schools are said to have been but partially successful in their results until the establishment of experimental shops. In these workshops the student is given the widest opportunity to apply his knowledge. The field of experimentation is boundless in any trade. The secrets are never all told, the mysteries never all solved. The hope of reaching something unknown, of discovering something of value, is one of the most powerful incentives to persistent application and careful research, both of which are of inestimable value in training the mind and the hand for the work of a lifetime. Theoretical knowledge can here be turned to practical account. The vague and hazy becomes plain and simple in the light of concrete objects. The experimental shop is the shop of progress.

Workshop.—The workshop is distinguished from the experimental shop in that the former is intended primarily to offer practical experience in the conduct of a trade, free from all tests, experiments, and research, while the experimental shop is primarily for the application of acquired knowledge, for inquiry into the unknown, although this necessarily also involves considerable valuable practice in a trade. Some German manufacturers are said to complain that the workshop makes the student too one-sided and gives him a narrow training. Another objection raised is that the student gets into bad habits in the practice of economy. He generally gets all the raw material that he needs, it is claimed, and this makes him a spendthrift in active business. Here, however, the blame must be charged not to the workshop, but to its director. These shops are quite common in Germany. No modern statistics are at hand, but Baden alone had 104 of such shops in 1896. All are reported to have received Government aid.

Practice courses.—These courses are designed for “masters” (Meister) in a trade, and are to furnish opportunities for their meeting. At the meetings the latest advances of the trade are discussed, papers are read, and social greetings are exchanged. The success of these “courses” seems to rest largely upon the principle that when a number of tradesmen, who each know a little of the news of their trade, get together they will, as a body, know a great deal. It is obvious that much can be done for the advancement of the local interests of an industry through the exchange of ideas and the discussion of trade reports and technical papers.

Workmaster schools.—These institutions are far more pretentious than the practice courses in their aims and in the importance of their curriculums. Some of them pursue work of such a grade that they assume a much higher rank than would justify their classification among the lower industrial schools. Most of the institutions, however, belong to this class. The workmaster schools, as the name implies, were established for the further instruction of masters in a trade. They were organized in recognition of the inadequacy of instruction offered in most of the professional trade schools, in which work is frequently done by students in the evenings or on Sundays, when the body is weary from a day's or week's physical exertion and the mind is dull from the fatigue of the body. These schools have been organized for all the more difficult trades. The entrance requirements generally are an age of at least 16 years, and two or three years of practical experience in the trade. The courses cover about one year to one and one-half years, with thirty to forty hours of instruction a week. They confine themselves closely to the immediate needs of the trade, and can for that reason accomplish much in the time allotted to study. In 1855 the Saxon Government established a number of such workmaster schools, which were open, however, only to the “best and most industrious students” of a trade.

MIDDLE INDUSTRIAL SCHOOLS.

The middle industrial schools (gewerbliche Mittelschulen) rank between the lower trade schools and the associated institutions, just discussed, and the higher engineering schools and technical high schools. The need for this class of institutions is readily seen. Entrance into the technical high schools calls for graduation from a

real-gymnasium or gymnasium, or some equivalent, so that the graduate of the German technical high school has probably attained his twenty-fourth year (estimate of Professor Roscher, Leipzig). The education which he acquires exceeds by a liberal margin the needs of numerous industries. There are many positions somewhat less than the highest rank which must be filled from somewhere by well-trained technologists, though graduation from a technical high school is unnecessary. The completion of a technical high-school course lets the right time pass by for the acquisition of practical experience; it takes much time and money, and it unnecessarily exposes the student to the trying and sometimes disastrous influences of academic freedom such as is the privilege of a student at any of the highest educational institutions of Germany.

To avoid these difficulties and to provide a quicker and sufficiently adequate training for young machinists and technologists in the middle branches of industry, the middle industrial schools were organized. This class of men had to be educated somewhere. If they went to the lower industrial schools there was danger that they would raise the standard of these schools too much, and thereby destroy their efficiency in ministering to the wants of the lowest ranks of trade; if they attended the technical high schools there was danger that they would lower the grade of work therein too much by requiring the introduction of courses below those already offered, thereby endangering the position of these great schools as leaders among the technologic institutions of the world. The place filled by the middle industrial schools is shown by the fact that, according to Professor Roscher, in 1898, these schools supplied 2,157 out of 3,281 engineers, or 66 per cent, employed by 105 prominent German manufacturers. Most of the remaining 1,124 positions were filled from the technical high schools, and a majority of them were of such importance that only graduates of technical high schools could competently fill them. The first of the middle industrial schools was established in Chemnitz in 1836, and at present has almost 6,000 students, coming from all parts of the Empire.

HIGHER INDUSTRIAL SCHOOLS.

The class of higher industrial schools embraces the highest Technika, or institutes of technology, the highest engineering schools (Maschinenbauschulen), and the technical high schools (technischen Hochschulen). Some writers class the Technika and the engineering schools with the middle industrial schools, and place the technical high schools in a class by themselves. When the high standard of work in the former institutions is considered, it will be apparent that by placing them in the middle class this group of schools will be made quite too all embracing, however much the technical high schools may deserve their lofty position among the finest technological institutions of the world.

The main special characteristics of the class of higher industrial schools are, more difficult entrance requirements than the lower class of schools, more and deeper theoretical instruction, more expanded curriculums, and longer courses. From these institutions go forth the men who are to become the leading technologists of the German Empire and, in many cases, of the world. Many of the graduates find their way to other countries. The great factories and transporta-

tion agencies of all the leading lands employ hundreds of technologists who have received their training in the German technical high schools. At the famous technical high school at Berlin-Charlottenburg one may find in attendance young men from England, America, Russia, France, Italy, Spain, Belgium, and many other countries. These schools offer the best and highest technical instruction that can be had. They are paid tribute by the press in all countries. They constitute the world's laboratories for technical research and are aids to the advance guards of technical progress.

CLASSIFICATION BY CURRICULUM.

We have just now divided the German industrial schools into three great classes on the basis of their standards and aims of instruction. By taking another view of their character these schools may be classified as general trade schools and special trade schools. The former are the industrial continuation schools already briefly discussed. Their curriculums are general. They do not teach any particular trade, but give only an elementary practical training. The special trade schools are by far the most important. As their name implies they teach one trade. Their curriculums are specialized, and confined to a single calling.

CLASSIFICATION BY OCCUPATION.

In classifying the German industrial schools on the basis of the kind of occupation taught, the different groups will necessarily overlap here and there. No clear-cut line of demarcation can be drawn. The various groups will reach into one another very much as the activities of men of different callings reach into one another.

The German industrial schools have been arranged in the following classes because the writer conceived this grouping to offer the best basis for a discussion of the German industrial school system such as will be entered upon in concrete fashion in the following papers. With some of these groups the reader is already familiar; the others will be presently introduced.

There may be distinguished (1) general industrial schools (*gewerbliche Fortbildungsschulen*); (2) special trade schools (*gewerbliche Fachschulen*); (3) schools for domestic science (*gewerbliche Schulen für Mädchen*); (4) commercial schools (*Handelsschulen*, or *Handelslehranstalten*); (5) industrial art schools (*Kunst-Gewerbeschulen*); (6) technical high schools (*technische Hochschulen*).

With the general industrial schools, the special trade schools, and the schools for domestic science, as well as with the technical high schools, we are already somewhat familiar. The commercial schools, known in the German language as *Handelsschulen*, *Handelslehranstalten*, and also as *kaufmännische Schulen*, or *kaufmännische Fortbildungsschulen*, teach, as their name implies, the calling of the retail and wholesale merchant and of the world trader.

The schools for industrial art, which have hitherto not been mentioned, are the most recent in origin of all the industrial schools. They aim at the utilization of art in industry. They strive to teach the method and develop the ability of applying the graceful and harmonious forms of the artistic in nature to practical objects of trade and consumption. What once was made simple, durable, and serviceable,

is to be so produced that it may, in addition to these necessary qualities, also possess the attraction of things beautiful. The vase, the candlestick, the lamp, the table, the dress pattern, the engraving, all are to be made in harmony with the delicate lines and the artistic forms of modern art. The architect is to learn to build structures whose exteriors and interiors present the harmonious blending of well-conceived art. The sculptor is to learn to chisel for us statuary that reveals a classic taste of the beautiful. The painter is to learn how to reproduce faithfully the wonderful harmonies of nature. In short, the artisan in any trade is to be more than a mere mechanical producer of useful commodities. He is to learn how to add to his work the touch of the artistic, the form of the beautiful, the attraction of the graceful, the calm sense of the harmonious. Wonderful is the work that has already been accomplished in Germany by these schools. In shop windows everywhere the lavish display of countless beautiful conceptions of industrial art are eloquent testimony of the effectiveness of these institutions. Their organization, development, and curriculums will be the subject of a later discussion.

Having briefly completed the classification of the German industrial schools on various bases, and presented the classification which will serve as a basis in the ensuing discussion, we are now ready for attention to the first class—the general industrial continuation schools (*gewerbliche Fortbildungsschulen*)—which will be the subject of the next paper.

5. PRIMARY INDUSTRIAL CONTINUATION SCHOOLS.^a

CHARACTER AND AIM.

The preceding paper has already familiarized the reader, in a general way, with the character, scope, and aims of the industrial continuation schools and their position in the industrial school system of Germany. They are general industrial schools, as they do not confine instruction to any particular branch of trade or industry. They attempt to lay a general foundation of practical industrial knowledge in its most rudimentary and primary form. In opposition to the special trade schools (*gewerbliche Fachschulen*), they exist not for the few of a trade, but for the masses of the people—for the great numbers who can afford only the smallest offerings for an industrial education. They are valuable for the many young men who have not the wherewithal to acquire a higher industrial education; men who are compelled to go out into the world to earn a living as soon as they have completed the compulsory education of the common schools (*Volksschulen*).

These schools developed out of the early Sunday and evening schools mentioned in speaking of the evolution of the German industrial schools, and have two purposes, one of which has heretofore not been referred to: (1) To supplement the general education gathered in the common schools with such practical knowledge as will be of value in winning a livelihood, and (2) to cultivate the sense of religion, morality, and patriotism. When the student leaves the common schools (*Volksschulen*) he can choose to attend either the general continuation schools (*allgemeine Fortbildungsschulen*) or the industrial continuation schools (*gewerbliche Fortbildungsschulen*). The latter occupy the lowest rank in the German system of industrial education. They are the primary industrial schools.

TIME OF INSTRUCTION.

In order to offer the most convenient time for instruction, these schools are held largely in the evenings and on Sundays. Such hours are extremely unfortunate, but apparently unavoidable. The student comes to his work tired from the day's labor and in a state of physical and mental lethargy. A movement has been on foot for some time to transfer the periods of instruction, so far as possible, to the daytime,

^a Probably the most reliable and best informed writer on this subject is Dr. Oscar Simon, private adviser of the Emperor, and special adviser of the minister of commerce and industry. He has written profusely on the subject of industrial education, and is in a position to draw his material from original sources. Doctor Stegemann also is a well-known and enthusiastic promoter of the new education, and what he writes on this subject is always worth reading. For a list of works on this subject, see the bibliography, page 145. Many of these works are, on account of the early dates at which they were published, of historical rather than practical value.

but has met only partial success. The best results in this direction were probably attained in Baden, where, in 1899, 21 out of 46 industrial schools offered instruction in the daytime. In the merchants' schools the difficulty of reform is not so pronounced, as the sons of merchants can more easily leave the office during the day hours than skilled hands can leave their machines in the factories and workshops.

CURRICULUMS AND METHODS OF INSTRUCTION.

In almost all of the industrial continuation schools the three great subjects of instruction are German, arithmetic, and drawing. There are woven in with these fundamental branches subjects that possess value to local industry. In the larger industrial schools, which include all the general industrial schools of Baden as reorganized in 1868, geometry, trigonometry, algebra, physics, chemistry, natural science, and mechanics are taught in elementary form. In the great majority of schools these subjects are, however, omitted, as being too advanced.

The method of instruction is extremely practical. In the class for German, for example, the reading matter deals with industrial and business subjects, with technology, law (including the constitution of the Empire and the organization of the various States and principalities, the laws regulating the organization of trades, the laws governing labor, the laws on commercial courts, insurance, etc.), and political economy (including savings banks, syndicates, taxation, etc.).

In arithmetic emphasis is placed upon industrial bookkeeping, and in connection with discounting a study is made of the German statutes regulating checks, drafts, and bills of exchange. Loans, interest, and securities also receive attention, though in an elementary fashion.

In drawing, which is of exceptional importance in the industrial continuation schools, practical work is begun as soon as possible. The elements of the branch having been mastered, work is at once begun on professional trade drawing, machine drawing, and the sketching of designs from carefully prepared drawing cards. The sense of the artistic and harmonious is also cultivated through free-hand drawing of objects from nature.

In the commercial continuation schools special emphasis is placed upon the important studies of business correspondence, bookkeeping, commercial arithmetic, commerce and exchange, commercial geography, etc.

The industrial continuation schools for girls (*Mädchen-Fortbildungsschulen*) generally include sewing, darning, mending, tailoring, cooking, ironing, and other domestic duties. These schools are rapidly increasing in numbers. Some of them can boast of the attendance of American girls.^a

^aThose who desire to make a more detailed study of the curriculums of the German industrial continuation schools are referred to the following Government publications: Prussia—*Vorschriften für die Aufstellung von Lehrplänen und das Lehrverfahren an den vom Staate unterstützten gewerblichen Fortbildungsschulen*, vom 5 Juli, 1897; Bavaria—*Paragraphe 29 to 33 of the Königliche Verordnung* vom 1 October, 1877; Württemberg—*Verfügung des Ministeriums des Kirchen und Schulwesens*, vom 25 März, 1895; Saxony—*Bekanntmachung des Kultusministeriums* vom 18 October, 1881; Baden—*Verordnung der Zentralstelle für die Gewerbe*, vom 30 November, 1891; Mecklenburg-Schwerin—*Zirkular* vom 2 Mai, 1890; Saxony-Weimer—*Ministerial Verordnung* von 20 März, 1875.

RELIGIOUS TRAINING.

Since instruction in these schools falls largely on Sundays and in the evening, the German fathers have, in their solicitude for the spiritual and ethical needs of human nature, not permitted the purely practical studies to monopolize the time of the young student. Provision is in many cases made for the cultivation of the religious feelings and the development of the nobler qualities in nature through the institution of religious discussions and lectures (religiöse Unterweisungen) delivered by ministers of the church or given as auxiliary exercises in connection with instruction in the German language.

In addition to this, "student homes" (Lehrlingsheime) have been established in which young men may gather during their free time, especially on Sunday afternoons, to spend pleasant hours participating in entertainment offered in the form of lectures, games, songs, declamation, amateur theatricals, etc. In 1902 Prussia had religious instruction in 250 schools and student homes in connection with 63 schools.

EXHIBITIONS BY CONTINUATION SCHOOLS.

A very prominent feature of the work of these continuation schools is the giving of exhibitions (Schulausstellungen), which occur in many parts of the country periodically every year or half-year. The purpose of these displays of the work of the school is twofold, to incite the students to greater effort in the competition for prizes, which are frequently offered, and to place before the public, and especially before the employers of labor, exhibits which illustrate the capacity of the students and the character of work done by them. In these exhibitions are condensed the best results of the instruction given, and the character of the work displayed may be accepted as a fair criterion by which to judge the efficiency of the school and the capabilities of the students. Not only do the students learn to recognize and appreciate each other's abilities and powers, but the interest of the public is enlivened and strengthened.

TEACHERS AND TEACHERS' COURSES.

The hiring of efficient teachers for these industrial continuation schools has long been a vexing problem. Especially is this true with regard to teachers for drawing. In many cases artisans, mechanics, architects, engineers, etc., are engaged. But even such "teachers" are scarce in smaller cities. Where they can be had they are frequently pedagogically unqualified, however thorough their practical knowledge may be. For this reason the task of instruction has, in by far the most numerous instances, been placed in the hands of common school teachers (Volksschullehrer), who execute these duties in the evening and on Sundays, thus supplementing their regular work. These men are generally given credit for enthusiastic and energetic instruction, but their common weakness seems to lie in a lack of familiarity with the practical subjects that they are to teach. This incapacitates them for fitting their instruction to the peculiarities, the intelligence, and the practical needs of the diverse student body, representing, as it does, numerous stages of education and wide differences in age and capacity.

To overcome the foregoing difficulties, special courses (*Ausbildungskurse*) for the education of teachers have been organized. The main studies taught are drawing, bookkeeping, commercial law, exchange, business correspondence, etc. In Prussia these courses fall into two divisions—higher and lower courses. The work in drawing covers six weeks, and the commercial studies mentioned above four weeks. This seems a very short period. Women are admitted to this work.

Up to 1902 drawing courses had been given in Berlin, Düsseldorf, Hanover, Elbing, Posen, Wiesbaden, Charlottenburg, Breslau, Erfurt, and Elberfeld. They are doubtless still given. Courses for the education of teachers for work in the commercial schools have as yet been offered in Berlin only. The number of teachers who completed the work in the drawing courses in Prussia from 1886 to 1903 was 3,508; 315 men and 35 women completed the commercial studies.

In Baden permanent provision has been made for the education of teachers for the industrial continuation schools. As early as May 26, 1857, a royal decree required that all candidates for appointment to a principalship (*Hauptlehrer*) of an industrial continuation school should have passed a prescribed examination, and should subsequently have taught in some school for at least three years. A decree of September 4, 1882, required all common school-teachers who desired to become teachers in the industrial continuation schools to attend the Builders and Architects' School (*Baugewerkschule*) of Carlsruhe. This institution made special provision for instruction in drawing and in associated commercial branches.

In addition to this, the royal decree of 1882 also pointed out the desirability of candidates engaging in practical work at some architectural bureau, machine shop, or factory, in order to acquire a practical experience, which invariably is the safest foundation on which to build. This suggestion has been generally accepted, and practical work for teachers has been established. At present 101 teachers holding positions in the industrial schools of Baden under regular Government commission received their training in accordance with the requirements outlined above. Teachers in the very lowest industrial schools of Baden need not observe the above regulations, and merely attend instruction at practical courses very similar to those found in Prussia.

In Strassburg half-yearly courses for the training of teachers have been established in association with the technical school of that city.

Courses somewhat similar to those given in Prussia are also found in Leipzig and Frankfort. These courses are, however, distinguished from those of Prussia, Baden, and Strassburg in that the latter are maintained by the State and city, while the former were established by the German Association for Advanced Industrial Education (*Deutscher Verein für das gewerbliche Fortbildungsschulwesen*). The courses in Leipzig and Frankfort include lectures on political economy, industrial and commercial law, industrial art, and technology. Various cities in other parts of the German Empire have also provided for the education of teachers for their own industrial schools.

COMPULSORY ATTENDANCE.

It was in the second half of the last century that the question of compulsory or optional attendance at the general industrial continua-

tion schools was raised. To-day that question seems to have been answered in favor of compulsion.

In Bavaria the decree of December 31, 1864, introduced three years of compulsory attendance at the Sunday schools, following the completion of the common schools (Volksschulen). Only those who expect to attend higher institutions of learning or who receive an equivalent of private tutoring are relieved from the above.

In Württemberg, under the law of March 22, 1895, those who have completed the common schools must attend either a general or an industrial continuation school for the period of two years, unless they wish to attend some higher school or receive adequate private instruction. The work in these schools must cover at least two hours a week throughout the year or four hours a week during the winter.

In Baden boys must attend two years and girls one year at either general or industrial continuation schools after completing the common school course. Every city must contain at least one continuation school unless excused by the proper public authorities for sufficient reasons. Instruction must be given for two hours a week for the year, or, with special permission, for three hours a week during the winter months. The law of August 5, 1898, requires all young men engaged in industrial pursuits during the day, and who are not yet free from attendance at some continuation school, to attend an industrial continuation school or a commercial continuation school, if there is one, and the student is employed in some mercantile pursuit. The law of July 17, 1902, expands the application of the preceding provision to include girls who are engaged in industrial occupations.

In Saxony much the same form of compulsory attendance at continuation schools exists by virtue of the law of April 26, 1873; in Hesse, by the law of June 16, 1874; in Saxony-Weimar, by the law of June 24, 1872; in Saxony-Gotha, by the law of July 24, 1897.

There has been considerable agitation in Prussia for the enactment of a law introducing compulsory attendance at the continuation schools, but so far without success. However, the laws of June 21, 1869, July 17, 1878, June 1, 1891, May 10, 1897, July 26, 1897, and June 30, 1900, have practically achieved their object, though they do not literally establish compulsory attendance. While the towns (Gemeinden) and local authorities were empowered to introduce compulsory attendance, the Prussian minister of commerce and industry was empowered to supervise their action, and "to see that proper measures were taken." In West Prussia and Posen this power has, for political reasons, been exercised so thoroughly that all of the 129 continuation schools, with their 17,810 students, are compulsory. In the rest of Prussia the Government found a powerful weapon in accomplishing its end by conditioning its annual subsidies to the continuation schools on the introduction of compulsory attendance. The result is that out of the 1,093 industrial continuation schools existing at present 895 have introduced compulsory attendance, while only 198 leave it optional.

RELATIONS TO OTHER SCHOOLS.

The general industrial continuation schools are partly independent institutions and partly associated with other educational institutions, either general or industrial, such as "real" schools, schools for mechanics, commercial schools, industrial academies, etc. In the lat-

ter instances they form *Nebenabtheilungen*, or branch departments. Only in rare instances do these schools enjoy the advantages of independent schoolrooms. Instruction in drawing is said to suffer most through lack of proper school buildings, and efforts have been made for some time to obtain separate rooms, though with little success, because of the heavy expenses that are involved.

FINANCIAL SUPPORT.

In the majority of cases the towns (*Gemeinden*) bear the main financial burden of these schools. Frequently, also, commercial and trade organizations such as chambers of commerce and guilds, as well as wealthy manufacturers, maintain them for the benefit of the young laboring population of the locality. In the Provinces of Posen and Western Prussia the schools are, for political reasons, state institutions, and the expenditures are met almost entirely by appropriations by the Government. In general, however, the German state governments restrict their material aid to subsidies which vary from one-half to two-thirds of the amount of the expenditures, not including the cost of rooms, heating, and lighting, which must be met by the towns, guilds, or other interested parties. The amount contributed by the Prussian Government also depends upon whether the schools have compulsory or optional attendance.

DISTRIBUTION AND ATTENDANCE.

On January 2, 1902, Prussia had 1,684 continuation schools, with 203,250 students, of which 1,093 were industrial continuation schools (of these 895 had compulsory and 198 optional attendance); 291, with 14,895 students, were guild schools (*Innungsschulen*); 244, with 23,037 students, were commercial continuation schools; (of these 146 had compulsory and 98 optional attendance), and 56 were association schools (*Vereinsschulen*); that is, schools maintained by laborers, mechanics, apprentices, associations, etc.

In 1900 Bavaria had 274 industrial continuation schools, of which 225 were independent institutions and 49 were associated with "real" schools. The total attendance was 39,247. Of the 274 schools, 180 had compulsory attendance and 194 optional. These figures do not include some 30 mechanical drawing schools (*Handwerkzeichenschulen*). In 1900 Bavaria also had 20 commercial continuation schools (*Kaufmännische Fortbildungsschulen*), of which 10 were independent and 10 associated with "real" schools.

Saxony has 44 industrial continuation schools at present.^a In 1899 there were 36 of these schools, of which 24 were maintained by associations, 10 by local political and school bodies, 1 by a guild, and 1 by a private person. With the exception of 6 schools, all institutions had regulations whereby students attending the industrial continuation schools were excused from attendance at the general continuation schools. In addition to the foregoing primary industrial schools, Saxony has 12 industrial drawing schools, with 833 pupils; 47 primary

^a For a summary on the industrial schools of Saxony see the recent consular report by Commercial Agent Ernest L. Harris, published in Advance Sheets from Monthly Summary of Commerce and Finance, No. 1704, July 23, 1903.

commercial schools (Handelslehrlingsschulen), with 4,744 students, and 1 industrial school for girls.

In 1901 Württemberg had 235 industrial continuation schools for boys and 16 for girls. The former were attended by 19,639 students and the latter by 971. This does not include the 26 schools for domestic science, with 5,422 girls on the rolls.

In 1902 Baden had 46 industrial schools (Gewerbeschulen), with 8,152 students; 96 industrial continuation schools (gewerbliche Fortbildungsschulen), with 1,869 students; 28 primary commercial schools, with 2,400 boys and over 200 girls, and more than 30 schools for domestic science.

CONCLUSION.

From the foregoing it is apparent that the system of primary industrial schools in Germany has already been quite fully developed. The schools are scattered far and wide in great numbers. Attendance is probably compulsory in the majority of cases. Either the young man must attend the general continuation schools for several hours a week in the evenings or on Sundays, after the completion of his common school education, or he may choose a more practical training in the primary or the higher industrial schools.

It is well to remember that the industrial continuation schools, which have been the subject of the present discussion, are the lowest class of industrial schools, and cap the common school education by giving the young men and women, who must at once embark upon the task of earning a living, the rudiments of a practical education. Further, they do not teach any particular trade, but maintain distinctly general curriculums. To those schools which do teach one particular trade, the special trade schools (gewerbliche Fachschulen), attention will next be given.

6. TEXTILE SCHOOLS.

EVOLUTION OF TEXTILE SCHOOLS.

Spinning schools.—The first technical schools established in Germany for education in the textile industry were the “schools for spinners.” These were organized in large numbers during the eighteenth and the first half of the nineteenth century for the improvement of the hand-spinning industry. With the development of the mechanical spinning industry these schools were gradually crowded out and one by one dropped from existence. Attention was then withdrawn from hand spinning and directed to hand weaving, which industry hoped to maintain its independence against mechanical weaving, with its simpler patterns woven in coarser numbers, through the further perfection of the technical features of the hand trade and the production of difficult hand designs.

Weaving schools.—To accomplish this purpose a large number of “schools for weavers” were established from 1830 on. The most important were those at Elberfeld (1844) and Mülheim on the Rhine (1852), Prussia; Münchberg, in Bavaria (1855); Reutlingen, in Württemberg (1855), and Chemnitz, in Saxony (1857). In harmony with their declared purpose, these schools confined their instruction primarily to the technical features of hand weaving, cutting, imitating, calculation of stuffs, designing, and pattern drawing. The school in Elberfeld also contained a chemical department for the instruction of dyers, printers, bleachers, manufacturers of dyes, and druggists; but this branch is reported to have been but sparsely attended.

With the further evolution of mechanical weaving which was associated with the use of finer yarns and the production of improved pattern goods, hand weaving dropped more and more into the background. Then the same change noticed in the case of the early spinning schools took place in the weaving schools. Attention was turned to instruction in mechanical weaving, in which the study of patterning, as pursued in the hand-weaving schools, attained added importance. During the earlier years instruction in mechanical weaving was largely theoretical, but with the rapid advances in the technics of the trade and the strengthening of competition, as well as the specialization of skilled labor, the opportunities for thorough and systematic training of apprentices in the weaving factories were greatly decreased. Time was too precious for the instruction of new hands in the factory. As a result, most weaving schools have now been supplied with machine looms, and the curriculums are so rearranged that particular attention may be devoted to the mechanical technics of the trade.

In this great era of machine manufacture most of the early hand-weaving schools have fallen out of existence. Only in a few of the poorer regions of the Empire, namely, in Saxony and Silesia, where hand weavers, because of lack of other employment, eke out a miserable existence, do we find a few schools, generally called “apprentices’

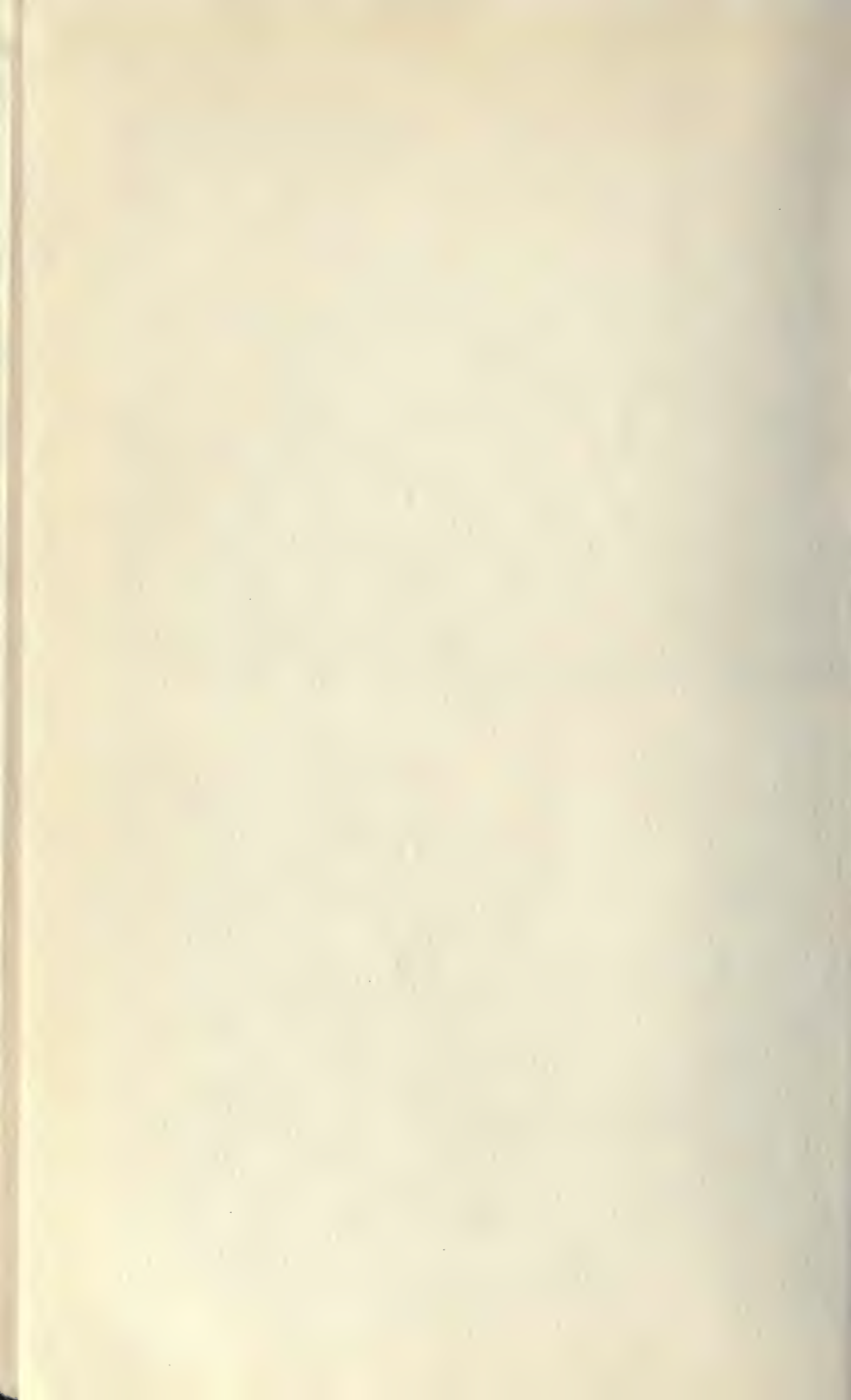


A. EXTERIOR OF BUILDING.



B. CHEMICAL LABORATORY.

HIGHER TEXTILE SCHOOL, AIX LA CHAPPELLE, GERMANY.



shops for weavers" (Lehrwerkstätte für Weber), where a simple but practical training is offered in hand weaving in order to maintain this industry as well as possible under the extremely untoward conditions which exist to-day.

Specialization of textile schools.—Another step in advance is found in the specialization of schools for a given branch of weaving. It was found that with the rapidly increasing division of labor and the increasing technical difficulties the existing textile schools were no longer able to train apprentices properly in all branches of weaving and to fit them for all kinds of skilled labor. Not only did the allotted time and the capacity of the learner forbid this, but the scarcity of good teachers and the limitations of school equipment covering the entire industry as well. The result was that, originally in Prussia and later in other German States, schools were established in which instruction was limited primarily to that particular branch of the textile industry which flourished in the locality, though instruction in other departments was not forbidden. Hence there evolved the special schools for instruction in the wool, linen, cotton, and silk industries, which, while they necessarily overlap in their curriculums, nevertheless emphasize their own special branch of instruction.

In other branches of the textile industry, outside of the weaving trade, a similar evolution occurred. The necessity for special technical knowledge and the acquisition of high skill in hand work, as well as in the manipulation of the intricate machinery of the trades, called for special schools for spinning, rope making, dyeing, finishing, knitting, passementerie, embroidery, etc., all over the country. These schools are now scattered throughout the German Empire, and are eloquent proof of the importance of the German textile industry. As might be expected, they are most numerous in the great textile regions, and are found in particularly large numbers in the lower Rhine Valley and in Saxony.

IMPORTANCE OF TEXTILE SCHOOLS.

The importance of these schools to the country can not be overestimated. They are the main pillar by virtue of which the German textile industry maintains its competitive power in the foreign market. Cheapness of labor is not sufficient to attain this end. Cheap hands must be taught, and taught well, or their work will in the end cost more than that of more expensive hands which possess high skill and a thorough understanding of their trade. This demand the German textile schools are meeting with greater success every year. Their curriculums are being frequently reorganized and the methods and means of instruction keep up with the progress of the day.

To the German textile industry this is all-important, for it is probably more largely than any other industry dependent upon foreign markets. It is only so long as the Fatherland maintains the high skill of its textile workers and preserves their physical efficiency that Germany can hope to hold the ascendant position which she now occupies in the world's textile industry. This industry is one of her greatest, and represents one of the most important incomes of her people. It gives employment to many thousands, and difficult indeed would be the task to find work for all these should a great national catastrophe befall the people of this trade through successful foreign competition. The

necessity of foreign markets finds an eloquent proof in this greatest German textile center, Chemnitz, where prosperity reigns at present because of the enormous amount of hosiery and gloves exported to the United States. Several years ago, when that export had fallen low, this city was the scene of great lamentation and misery. Thousands of skilled workmen and workwomen lay idle, and were quite unadapted to any other kind of work.

It is undoubtedly because of this necessity of maintaining the supremacy of German textiles of the finest grades that the Empire is so tenderly fostering its textile schools. From these institutions go forth men and women who have learned the art of creating the finest of woven fabrics out of cotton, wool, and silk that the world knows. Every conceivable branch of the textile industry is represented. Spinning, weaving, dyeing, finishing, lace making, embroidering, knitting, designing, ribbon making—all are taught. Cotton, wool, silk, and linen fabrics receive attention. How numerous these schools are can be seen from the following summary of the most important in the country.

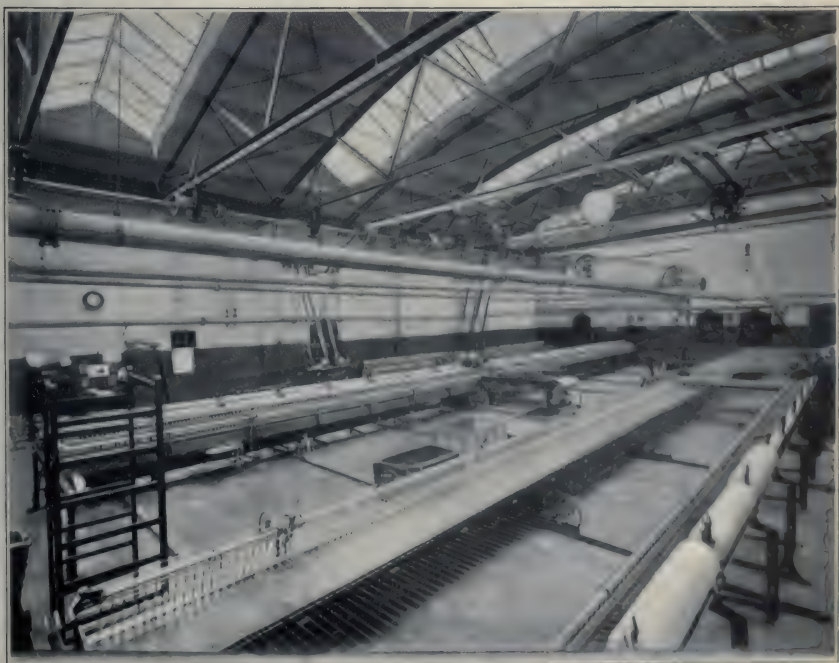
LOCATION OF TEXTILE SCHOOLS.

In Prussia: Higher school for textile industry, at Aix la Chapelle, with four departments for spinning, weaving, dyeing, and finishing, and special courses in designing, burling, and darning; higher school for weaving, hand lace making, machine lace making, embroidering, trimming, designing, and dyeing, at Barmen; higher school for weaving, dyeing, knitting, passementerie, embroidering, designing, and making linen goods, at Berlin; Cottbus higher school for the woolen industry, with departments for weaving, dyeing, finishing, darning, and designing; Créfeld higher school for the silk and velvet industry, with departments for spinning, weaving, dyeing, finishing, embroidering, and designing; München-Gladbach higher school for the cotton industry, with departments for spinning, weaving, dyeing, and finishing; Sorau higher school for the linen industry, with departments for flax culture, spinning, rope making, weaving, dyeing, finishing, designing, and hand work in linens; Forst school for the woolen industry, with departments for weaving, dyeing, darning, and designing; Sommerfeld and Spremberg schools for the woolen industry, with department for weaving; Mühlhausen school for the woolen and half-woolen industry, with departments for weaving and knitting; Ronsdorf school for ribbon making; Langenbielau school for the linen and cotton industry, with departments for weaving, dyeing, embroidering, and making linen goods; Bramsche school for linen weaving; Eupen school for wool weaving. Aside from these institutions Silesia has seven schools for hand embroidering. Embroidering and other hand work is also taught in a number of industrial schools for girls.

In Saxony: The most important textile schools of Saxony include 27 for weaving, knitting, and passementerie, 28 for hand lace making, and 1 for embroidering. Of the 27 weaving, knitting, and passementerie schools only 5 weaving schools and 1 knitting school have instruction during the daytime. The leading schools of Saxony are the Chemnitz higher school for weaving; the Werdau higher school for weaving; the Plauen Royal industrial school, with departments for designing, weaving, embroidering, and lace making; the Zittau higher school for weaving; the Seifhennersdorf school for weaving; the Limbach knit-

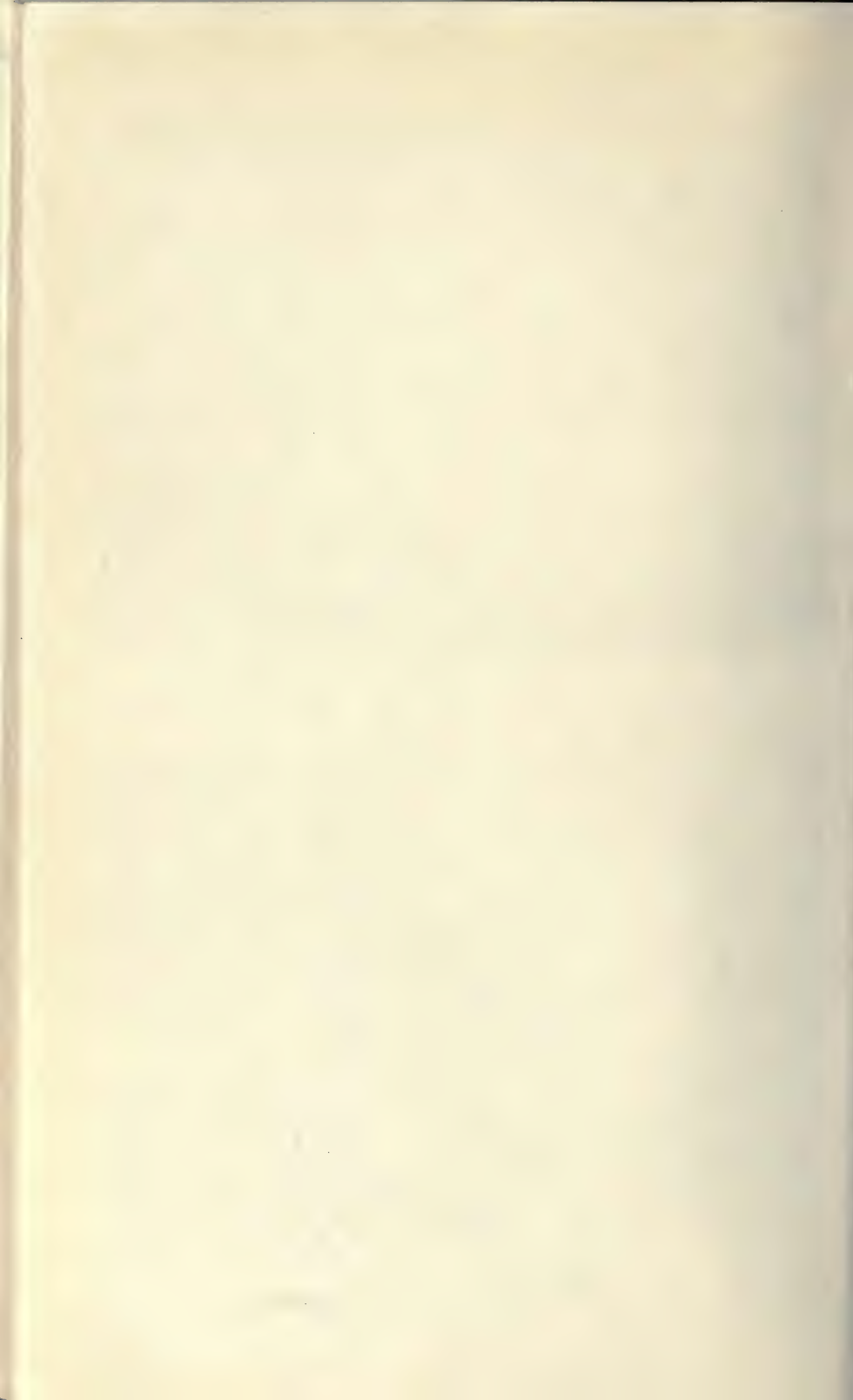


A. CARDING ROOM.



B. FINE WOOL SPINNING ROOM.

HIGHER TEXTILE SCHOOL, AIX LA CHAPELLE, GERMANY.



ting school; the Hohenstein-Ernstthal weaving school; the Gross-Schönau weaving school; the Greiz weaving school. Aside from these there are in Saxony a number of smaller evening schools for weaving, lace making, embroidering, etc.

Bavaria's leading textile schools are the Münchberg weaving school; the Lamprecht weaving school; the Passau weaving school; the Enchenreuth school for embroidering; the Stadlern school for hand lace making.

The leading textile schools of Württemberg are the Reutlingen school for spinning, weaving, and knitting; the Heidenheim school for weaving; the Laichingen school for weaving; the Sindelfingen school for weaving; the Wolfschlupen school for knitting.

Hesse-Darmstadt has a school for weaving at Lauterbach, and Alsace-Lorraine has a school for spinning and weaving at Mülhausen.

LACK OF UNIFORMITY IN TEXTILE SCHOOLS.

The foregoing is by no means a complete list of all the textile schools of the German Empire. Only the leading institutions are enumerated. Numerous smaller schools are scattered throughout the textile regions in the little towns, or Dörfer. In the absence of a unified Government control and a centralized supervision and direction of the curriculums and the methods of instruction in the textile schools of Germany, each locality adhered to its own views of what constituted a good textile school. The result was the development of a widely dissimilar set of schools, each with its own peculiar characteristics. No comparison, no classification, no systematic arrangement of these institutions was possible as they stood. Moreover, each kingdom, each principality, had charge of its own schools, as is the case to-day. The need of better Government control was apparent many years ago, and it was not long before action was taken to gather up the confused mass of schools and to introduce order and system into them.

REORGANIZATION OF PRUSSIAN TEXTILE SCHOOLS.

Typical, and of the greatest importance in its influence upon German textile education was the reorganization of the textile schools of Prussia undertaken in 1896. Interesting and instructive as this movement was, space does not permit of a detailed discussion of its progress. Only the main principles which governed in the reconstruction will be given here. In the first place, the aims of the various textile schools were more clearly defined. Instead of being a hodgepodge the curriculums were so constructed as to confine instruction primarily to that branch of the textile industry which flourished in the locality in which the school was situated. Secondly, other branches of the industry might be taken up so far as the ability of the teachers, the time of the students, and the financial means of the school permitted. Further, the equipment of the schoolrooms was considerably improved. Models, charts, machinery, drawings, and the numerous other essentials for efficient instruction were replaced, improved, or introduced. The duration of the courses in the various branches was also determined. This was absolutely necessary if any comparison of the work of the schools was to be made. Obviously the young German who had studied spinning or finishing at a school offering a course of two years was much better equipped and deserved a better position than the one who

had attended a course of one year or half a year, other things being equal.

Another valuable reform was the introduction of stringent graduating examinations conducted by a Government commission. This removed the practice of granting a graduation diploma without regard to any particular standard of knowledge, so that no employer could rely upon the possession of such proof of "graduation" by a student as representing the knowledge and understanding of a trade that he required. In order to improve the quality of instruction provision was also made for the training of teachers, and their employment only when proper evidence was given of competence and of unmistakable familiarity with the technical elements of the trade. Finally, in order to give the new regulations force and to insure their proper observance, provision was made for the supervision of the work of the schools by capable men engaged in the textile business, and hence well qualified to judge of the practical value of the instruction offered.

To cap this reform and to put the finishing touches to the splendid system of textile schools which was created through the reorganization sketched above, there has developed during the last seven years another organization which has succeeded in binding together the well-organized individual schools. It has given to the whole system a unity such as springs from a general central supervision and control. This organization is the Central Technical Bureau for the Textile Industry (*Technische Zentralstelle für die Textil-Industrie*), known under that name since the year 1901. It is not the product of a day's legislation. Step by step it developed as the necessities of the time called for it. To-day its benevolent influence is felt everywhere in the textile world. It stands as an able advance guard fighting its way onward to greater perfection in the education of young men for a career in the German textile industry. It has its headquarters in Berlin. It is an official body and its functions are exercised under Government sanction and with Government support. Its members are capable men of high rank. To all intents and purposes this council is the mouthpiece of the Government in making known its wishes and exercising the control that is deemed necessary over the system of education in industry in general, and in the textile industry in particular.

This Central Technical Bureau for the Textile Industry grew out of the Institute for the Equipment of the Textile Schools (*Lehrmittel Anstalt für die Fachschulen der Textil-Industrie*), which was founded in 1896, and whose duty was to supply the textile schools with wood, wire, pasteboard, models, blackboards, maps, drawings, charts, draftings of textile machinery, and samples of all kinds for study in patterning and designing. The leader of this organization was the director of the Berlin school of weaving, to whom were given such assistants as the work demanded.

In 1896, when the textile schools were reorganized, additional functions were given the director in the form of (1) a general supervision of all the Prussian textile schools; (2) the conduct of all business connected with the half-yearly examinations; (3) the supervision of the institutions for the education of teachers for the Prussian textile schools.

When, two years later, in 1898, the numerous schools for embroidering were established in Silesia for the promotion of the house industry (*Hausindustrie*), they also were placed under the supervision of

the Berlin director. Not long afterward power was given him to advise the Prussian minister of commerce and industry on matters relating to textile education, to undertake tours of inspection, and to formulate technical instructions, curriculums, examinations, etc., for the textile schools of Prussia. These duties soon grew too onerous and too manifold to permit of their discharge in connection with the regular work of the director, even when assisted by capable subordinates. In 1901, therefore, a special organization was established to take charge of all this work. Very aptly it was called the Central Technical Bureau for the Textile Industry. Upon the request of many leading German textile manufacturers and prominent public men this institution was also charged with the duty of conducting mechanical and chemical experiments in the field of textile technology. Certainly the task before the bureau was no small one. Great, also, were the opportunities for a benevolent exercise of its powers in the interests of the German textile industry. Judging from all reports that have come to the attention of the writer all that was expected from the work of this organization has been fully realized. To-day it stands as the most powerful guardian of the welfare of one of Germany's most vital industries, for the textile industry is one of the great pillars on which rests the prosperity of the German people.

CLASSIFICATION OF TEXTILE SCHOOLS.

While the German textile schools could easily be classified, on the basis of that textile fiber to which most attention is devoted, into schools for the woolen, silk, cotton, and linen industries, it will be more valuable to present the classification which was made at the time of the reorganization of the Prussian schools in 1896. At that time all the textile schools were grouped, according to the scope and character of their curriculums and their aims, into two large classes, professional schools for the textile industry (*Fachschulen für Textil-Industrie*) and higher professional schools for the textile industry (*höhere Fachschulen für Textil-Industrie*), or, in short, the lower textile schools and the higher textile schools. The former are intended to develop the workmaster (*Werkmeister*), or artisan of the trade, and the latter are to develop the manufacturer and the director of a textile concern. One produces the skilled hand and the other the skilled supervisor.

The following are examples of the leading lower textile schools of Prussia: For the woolen and half-woolen industry in the cities, the schools at Forst, Sommerfeld, Spremberg, Falkenberg, and Mühlhausen; for the cotton, linen, half-linen, and jute industry, those at Einbeck and Langenbielau; for the ribbon industry, that at Ronsdorf. As a rule the preceding schools confine study to weaving alone. Those at Forst, Falkenberg, and Langenbielau have also departments for dyeing, and the Mühlhausen school has a department for knitting. Forst has also a department for darning, and Langenbielau has one for embroidering and linen sewing.

The higher textile schools of Prussia are at the following places: For the silk industry, Crefeld; for the cotton industry, München-Gladbach; for the linen industry, Sorau; for the woolen and half-woolen industry, Aix la Chapelle, Berlin, and Cottbus, and for the making of ribbon, trimmings, lace, etc., Barmen.

These schools have departments for instruction in the different branches of the textile trade as follows: Aix la Chapelle for spinning, weaving, dyeing, finishing, and darning; Barmen for weaving, hand and machine lace making, embroidering, trimmings, and patterning; Berlin for weaving, dyeing, knitting, passementerie, embroidering, and patterning; Cottbus for weaving, dyeing, finishing, and embroidering; Crefeld for weaving, dyeing, finishing, patterning, and (lately added) spinning; München-Gladbach for spinning, weaving, dyeing, finishing; Sorau for weaving, patterning, embroidering, and linen sewing, while departments for flax culture, spinning, rope making, dyeing, and finishing are being introduced. Work in these schools, as will be seen presently, includes theoretical instruction in the lecture room, experimental work in the laboratories, and practical work in the workshops connected with the institutions.

ADMINISTRATION.

With the exception of the schools at München-Gladbach and Aix la Chapelle all the higher textile schools of Prussia are local institutions (Kommunal-Anstalten). The school at München-Gladbach is incorporated, and the Aix la Chapelle school is conducted under the auspices of the local weaving school association (Webschulverein). The immediate direction and supervision of the schools is in the hands of a body called a Kuratorium, composed of representative men of the locality engaged in the textile industry and local government officials. In their general administration the schools are subject to the provincial president (Regierungs-Präsident), the direct representative of the Prussian Government in the province, and in their technical management they are subject to the Central Technical Bureau for the Textile Industry, to which reference has already been made.

ATTENDANCE.

The total attendance at the German textile schools in 1899 was 1,005, and in 1901, 1,373. Of the latter number, 1,024 attended the higher textile schools and 349 the lower textile schools. Of the 1,024 who attended the higher textile schools, 459 were enrolled in the day courses and 565 in the Sunday and evening courses. The following is a brief summary of the attendance at the different schools during the summer semester of 1901:

Attendance at German textile schools in 1901.

Location of school.	Day school.	Evening and Sunday school.
Higher schools:		
Aix la Chapelle.....	67	42
Barmen.....	52	172
Berlin.....	56	133
Cottbus.....	33	39
Crefeld.....	170	125
München-Gladbach.....	39	42
Sorau.....	42	12
Total higher schools.....		
Lower textile schools.....	459	565
Nowawes workshop.....	166	148
	35	
Total attendance.....	660	713

TUITION FEES.

In general, there are two sets of tuition fees charged in the German textile schools, based upon nationality. German students pay a comparatively low fee of from 30 to 100 marks (\$7.14 to \$23.80), and in case of several of the higher textile schools 200 marks (\$47.60). Foreigners, on the other hand, are subject to a much higher tuition fee, ranging all the way from 250 to 1,000 marks (\$59.50 to \$238), with an additional fee of 60 marks (\$14.28) for entrance, in the form of matriculation charges. In Saxony, discrimination is exercised not only against foreigners, but against residents of other parts of the German Empire. In the higher school for weaving at Werdau, for instance, Saxons pay 150 marks (\$35.70), other Germans pay 200 marks (\$47.60), and foreigners pay 300 marks (\$71.40). Some Saxon schools exclude foreigners entirely from attendance. According to information at hand, one such case is found in the weaving school at Greiz.

The following table shows the tuition fees charged to Germans and to foreigners at the leading textile schools:

Tuition fees in German textile schools.

Location and name of school.	Germans.		Foreigners.	
	Marks.	Dollars.	Marks.	Dollars.
Aix la Chapelle Higher Textile School.....	100	23.80	500	119.00
Barmen Higher Textile School.....	200	47.60	1,060	252.28
Berlin Higher Textile School.....	60	14.28	1,000	238.00
Cottbus Higher Textile School.....	200	47.60	1,060	252.28
Crefeld Higher Textile School.....	200	47.60	1,060	252.28
München-Gladbach Higher Textile School.....	200	47.60	1,060	252.28
Sorau Higher Textile School.....	30	7.14	560	133.28
Chemnitz Higher Weaving School.....	180	42.84	400	95.20
Münchberg Higher Weaving School.....	100	23.80	600	142.80
Werdau Higher Weaving School.....	200	47.60	300	71.40
Greiz Weaving School.....	200	47.60	Not admitted.	
Reutlingen Higher Textile School.....	150	35.70	300	71.40
Sommerfeld Higher Textile School.....	30	7.14	250	59.50
Mülhausen Textile School.....	60	14.28	500	119.00
Plauen Textile School.....	60	14.28	200	47.60
Ronsdorf School for Ribbon Making.....	30	7.14	250	59.50

SPECIAL TEACHING.

Time was when the German textile schools taught practically every branch of the industry in one department. Spinning, weaving, dyeing, finishing, embroidering, lace making, etc., all came in for their share of instruction, probably under one teacher and in one room. Those were the good old days of homespun clothes, when the science of their making was the science of the home. New conditions called for new methods. The hand loom was replaced by the machine loom, and the little dye tubs gave way to immense vats in palatial structures. Especially within the last few decades have the rapid advances, the numerous inventions, the new processes of manufacture, rapidly crowding upon one another, created such complexity and intricacy in all branches of the textile industry that no school can hope to teach the textile trade successfully in a few courses. It is necessary to learn one thing and to learn it well. Specialization is the keynote of success. In harmony with this demand, German textile schools are rapidly specializing their courses and greatly adding to the efficiency of their instruction. Some schools have not completed the change;

others are models of the day. To one such modern institution we shall now turn for a closer look at its detailed curriculum of instruction. I have picked out for this purpose the Higher School for Textile Industry at Aix la Chapelle.

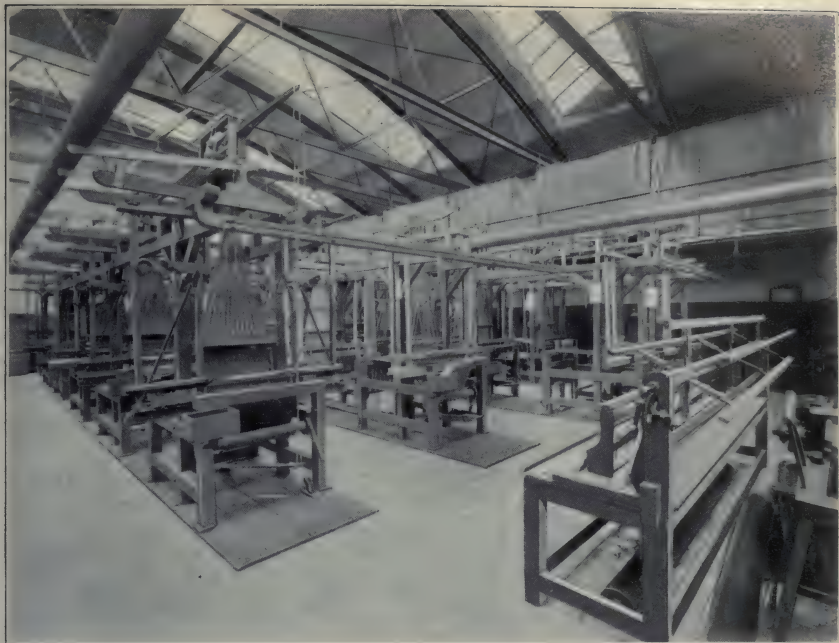
HIGHER TEXTILE SCHOOL OF AIX LA CHAPELLE.

General features.—The Higher Textile School of Aix la Chapelle is divided into four departments, for spinning, weaving, dyeing, and finishing, and has three affiliated courses in master studies, burling, and darning. Each department has its own curriculum and its own methods of study. The courses in spinning, weaving, and finishing can be completed in half a year, while the course in dyeing occupies a full year. The instructing force consists of ten regular teachers and five masters. The theoretical instruction of the class room is supplemented by thorough practical work in the large workshops, or actual textile factories, connected with the institution. A 100-horsepower engine supplies power for the operation of the factory, in which run all machines appropriate to the four branches of the textile industry taught in the school. Here students are at work passing the raw materials through the successive stages of manufacture. The products are placed upon the market. There are generally some 40 to 50 hands busy in the workshop. Local manufacturers as a rule contract for the output.

Entrance requirements.—For entrance into any of the four departments of the school proof must be produced of an education equivalent to that acquired in the common schools. In lack of such proof an examination is necessary in arithmetic and German. Foreigners must show sufficient familiarity with the German language to be able to follow the instruction with understanding. All students must have attained the age of 16 years. Previous practical employment in a textile factory, which is a quite common requirement in textile schools, is not required for admission into the Aix la Chapelle school, though it is strongly recommended. Those who desire such practical experience prior to taking the course are privileged to enter the workshop associated with the institution.

Classes of students.—Three classes of students are distinguished: Full course scholars (Vollschüler), who participate in all lectures and in all practical exercises of their courses; practitioners (Praktikanten), who are engaged in practical employment in the workshop only, and Hospitanten, or visitors, who attend lectures and other exercises by choice.

Time of instruction.—The courses occupy six months, with the exception of the dyeing course, which, as has already been said, takes one year. The half-yearly courses begin in the middle of March and at the beginning of October. The yearly course begins in March. Practicians may enter at any time. The half-yearly courses cover twenty-one weeks of forty-four hours each. Daily lectures come between 8 and 12 and 2 and 6 o'clock in the summer course, and between 8.30 and 12.15 and 2 and 6 o'clock in the winter course. Saturday afternoons are free. There are Christmas, spring, and fall vacations of about two weeks each. Those who desire to take examinations on completing the course may do so (though this is not required) and they are supplied with special diplomas showing their rank. Those who

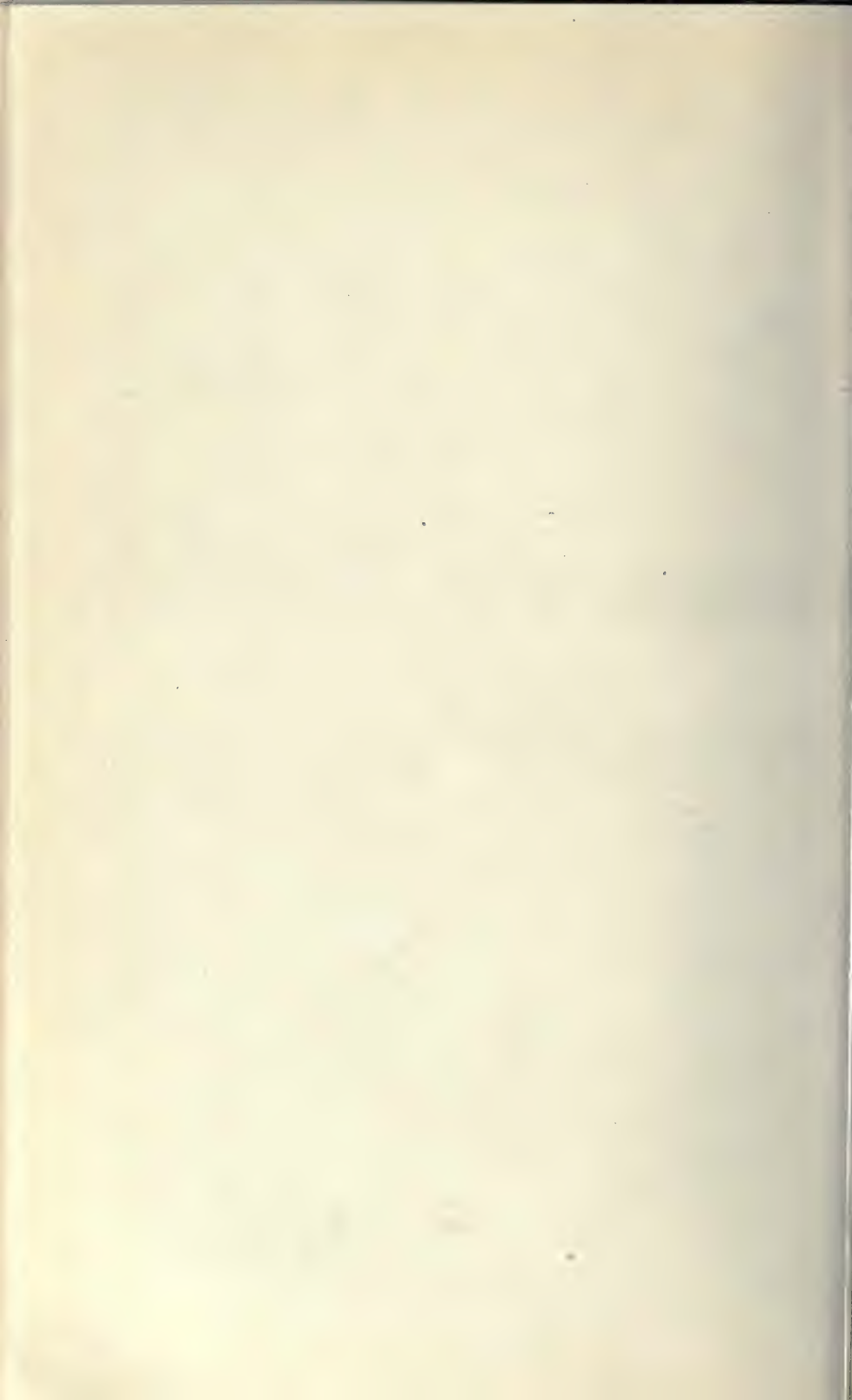


A. ANCIENT LOOM ROOM.



B. WEAVING ROOM.

HIGHER TEXTILE SCHOOL, AIX LA CHAPPELLE, GERMANY.



take no examinations are supplied merely with certificates of attendance at the school.

Tuition fees.—The tuition fees are as follows: Full scholars (Vollschüler), if Germans, pay 100 marks (\$23.80) for every half year; foreigners pay 500 marks (\$119) for the same period. Foreigners are not admitted to the course in designing, nor are they admitted as practitioners. German practitioners pay 50 marks (\$11.90) a month as tuition. Visitors, or Hospitanten, pay 15 marks (\$3.57) for every hour a week for the half year if German; if foreign, they pay 50 marks (\$11.90). In addition to the foregoing fees, foreigners are required to pay 60 marks (\$14.28) as admission fees. Tuition must be paid at the beginning of a course. Needy students may be relieved in whole or in part of the payment of tuition. Only one course may be attended and paid for at once.

Spinning department.—This department concerns itself mainly with the spinning of wool. Cotton, silk, and flax spinning are studied only so far as they are incidental to wool spinning.

The branches and hours of instruction in a week in the department for spinning are as follows: Spinning, 8 hours; raw materials, 1 hour; bookkeeping and professional arithmetic, 2 hours; weaving, 2 hours; chemistry and dyeing, 4 hours; textile engineering, 2 hours; drawing and sketching, 4 hours; textile legislation, 2 hours; practical work in the workshop, 19 hours; total hours a week, 44.

The eight hours a week devoted to spinning proper include (a) willowing, according to the various systems, mixing of qualities and colors in threads; (b) oiling (Fetten), purpose and kinds of oils, and their influence on spinning and finishing processes; (c) carding and combing, method of operation, carding machines, difficulties, two and three carding systems; (d) fine spinning, process and machines employed; (e) yarn twisting, degrees, directions, spools, machinery for thread making, worsted yarns, utilization of waste products; (f) utilization of yarns, what kinds for what materials.

The one hour a week for the half year devoted to the study of raw materials includes (a) kinds of textile fibers, their properties, with special reference to the properties of the various kinds of wool and the best utilization of these; (b) important wool-growing regions of the world; (c) properties and peculiarities of wools grown in the different sections; (d) trade usage in their distinction and identification; (e) sorting of wool; (f) washing of wool, machines and processes; (g) drying of wool, systems; (h) shoddy, manufacture, kinds, properties, identification, and use in trade.

The two hours a week for a period of six months devoted to bookkeeping and professional arithmetic cover the following ground: (a) Books most practical in keeping accounts in textile concerns, and their arrangement; (b) computations on raw materials, quantities required; (c) calculations on oils; (d) calculations on method of producing materials of given weight; (e) determination of weights in yarns and reduction of yarn numbers from one system to another; (f) calculations on threads; (g) market prices, market requirements, and production.

The two hours a week for a period of six months devoted to the subject of weaving include the following: (a) Definition of woven goods; (b) their classification; (c) work preparatory to weaving, spooling, cutting, glueing, building of chains; (d) weaving proper, hand and machine looms, jacquard machines, description of numerous kinds

of goods on basis of materials used, colors, closeness of chains, etc.; (e) flaws in weaving, determination of firmness of goods, main localities for manufacture of woven goods.

The four hours a week for the period of six months devoted to chemistry and dyeing include (a) fundamental conceptions of chemistry, elements and their combinations; (b) alkalies, acids, salts; (c) study of water, fuels, soaps, cleansing materials, oils, fats, finishing, melting, glueing, and smoothing substances; (d) chemistry of textile fibers; (e) chemical methods for the enhancement of textile fibers, mercerization, production of artificial silk and silk wool, carbonization, production of waterproof goods; (f) bleaching and dyeing methods; (g) production, purity, properties, and application of different colors; (h) influence of washing and finishing materials on colors and on cloth fibers; (i) determination of the properties of cotton and wool in mixtures; (j) study of the most important dyeing and printing machines from the chemical point of view.

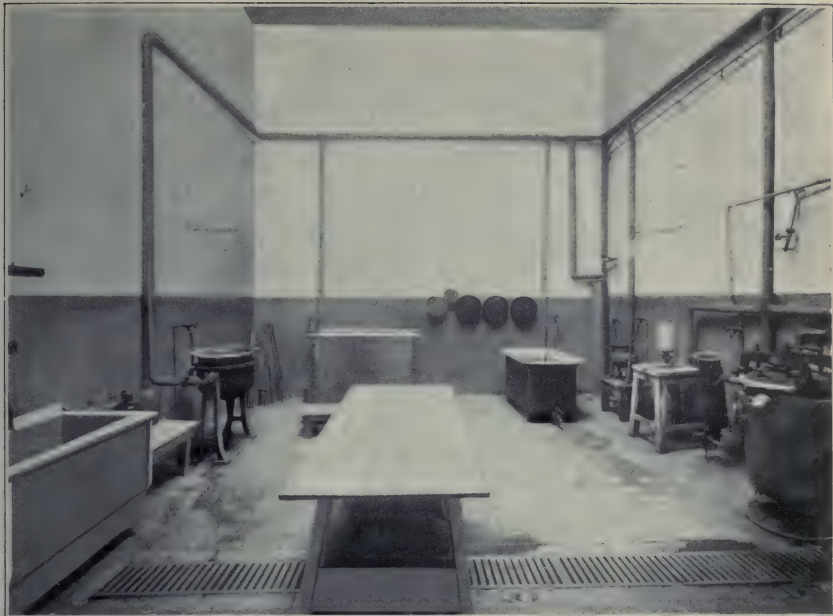
The two hours a week devoted for the period of six months to textile engineering cover (a) most practical power plant for the textile manufacturer and its most economical operation; (b) boilers in general, different systems and methods of heating, boiler armatures, supervision and testing, methods of economizing consumption of coal; (c) motor power, steam engines and turbines, water power (wheels and turbines), electrical and gas motors (determination of their strength and endurance), comparative study of value and application of these different motor agents; (d) factory buildings, different systems of construction, shed and story buildings, their advantages and disadvantages; (e) discussion and comparison of the various factory heating, ventilating, and lighting systems.

The four hours a week for the period of six months devoted to the study of designing and sketching cover (a) drawing of machines and parts of machines used in the textile industry; (b) drawing of factory grounds and buildings for textile establishments. When the intricacy and diversity of textile machinery are considered the four hours a week will be found by no means a liberal allowance.

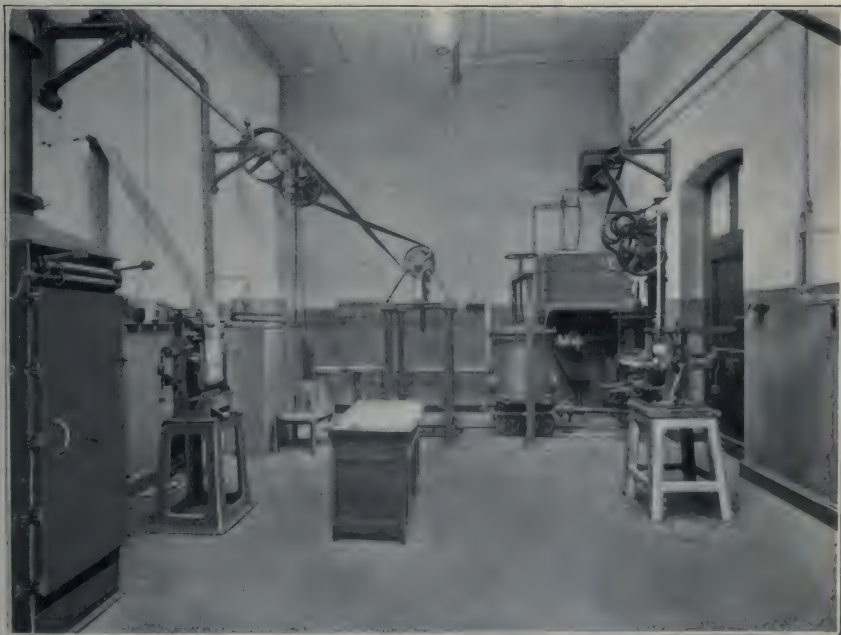
The two hours a week for the period of six months devoted to the study of textile legislation cover (a) most important laws governing German industry in general; (b) laws bearing particularly upon the textile industry; (c) relations of employer and employee, Sunday labor; (d) industrial supervision, industrial courts; (e) invalid, accident, and age insurance; (f) regulations governing the erection of boilers and machinery, employment of safety devices; (g) laws for the protection of workmen.

The nineteen hours a week for the period of six months devoted to shopwork cover (a) erection and cleaning of textile machinery; (b) removal and grinding of carders; (c) methods of mixing, willowing, and oiling fibers; (d) practical work on running machinery; (e) work in chemical laboratory, study and analysis of materials used in textile industry, oils, melting and glueing substances, water, dyes, soaps, etc.

Weaving department.—As is case with the department of spinning, this department concerns itself mainly with woollen fabrics, the study of cottons and silks being but incidental. The course in weaving offers a complete and independent study of the subject, but as a special feature of the organization of this department two other half-yearly courses are associated with the course in weaving proper,

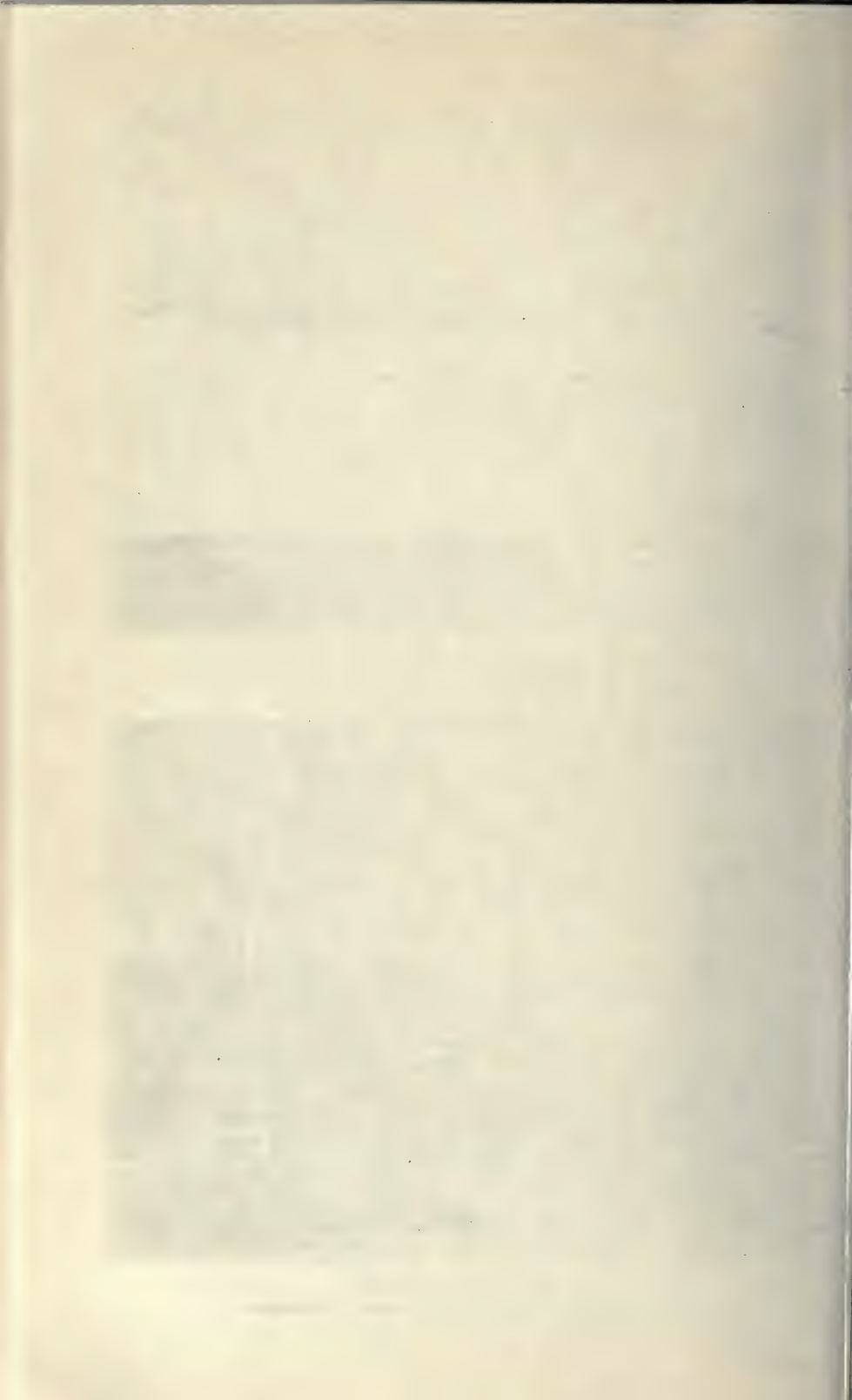


A. DYEING ROOM.



B. ADJUNCT ROOM OF DYEING ROOMS

HIGHER TEXTILE SCHOOL, AIX LA CHAPELLE, GERMANY.



namely, the manufacturing and finishing course and the designing course. These are added for special advanced work for weavers, and must not be confounded with the regular department for finishing, as the curriculums of the two courses in finishing are independent. Moreover, any of the three associated courses in the weaving department may be taken independently of the other courses. But since the logical order of the courses is (1) weaving proper, (2) manufacture and finishing, (3) designing, the regulations of the school require those who desire to enter course 2 or 3 to produce evidence of scholarship qualifications equivalent to the completion of the preceding course or courses.

The subjects and hours of study in the weaving course are as follows: Bindungslehre (Kompositionslehre), theory of plain and pattern weaving, Musterausnehmen (Dekompositionslehre), 24 hours a week; study of looms and practical work, 12 hours a week; raw materials and spinning, 2 hours a week; professional arithmetic, 4 hours a week; textile legislation, 2 hours a week; total hours a week, 44.

It will be unnecessary to explain the scope of any of the subjects given above, as they can readily be interpreted with the aid of the detailed exposition of the various subjects of instruction made in treating the spinning department. The thoroughness and scope of treatment in the three other departments are about the same as in the spinning course. The class in professional arithmetic, for example, instead of concerning itself with computations involved in the spinning industry, devotes itself to calculations incidental to the weaving industry. The fundamentals of the various branches are obviously identical for all of the four departments. These being taught, the specialized studies begin.

As appears from its title, the associated course in manufacture and finishing supplements the general course in weaving in affording an opportunity for the acquisition of more detailed knowledge of weaving machinery and of the process of cloth manufacture. The curriculum and weekly hours of study of the course follow: General and special engineering, 8 hours; calculation and manufacture of samples, 6 hours; chemistry and dyeing, 4 hours; finishing (very thorough course), 8 hours; practical work in weaving, dyeing, and finishing, 18 hours; total hours a week, 44.

The associated course in designing is the second associated course for more advanced study for weavers, and like the preceding course, occupies six months. Its curriculum and weekly hours of study are as follows: Drafting and execution of samples, development of patterns, theory and application of patterning, 38 hours; bookkeeping and arithmetic, 4 hours; study of dyes, 2 hours; total hours a week, 44.

Dyeing department.—While the courses in the two departments already discussed are undoubtedly very thorough in their six months' work, the dyeing department is probably the best in the Aix la Chapelle school, and is well deserving of attention from young men who contemplate the study of this trade. The full course in this department occupies two years, or in certain cases when previous training has been sufficient, but one year. The year opens in March. In contrast with the two preceding departments the dyeing department concerns itself not with wool alone, but with cotton, half wool, silk, etc., as well. The course in chemistry has likewise wider scope and greater thoroughness than in the spinning, weaving, and finishing departments.

The school supplies the students with the following free of charge: Working table with lock, fuel, dyeing material, chemicals, except nitrate of silver and platinum chloride. Upon deposit of 30 marks (\$7.14) the student also receives all apparatus, porcelain, glassware, etc., that may be necessary. Broken supplies are charged to the deposit at the current market price. Platinum wire and blowpipe must be supplied by the student himself.

The curriculum for the two years' study is as follows:

Curriculum of dyeing department, Aix la Chapelle textile school.

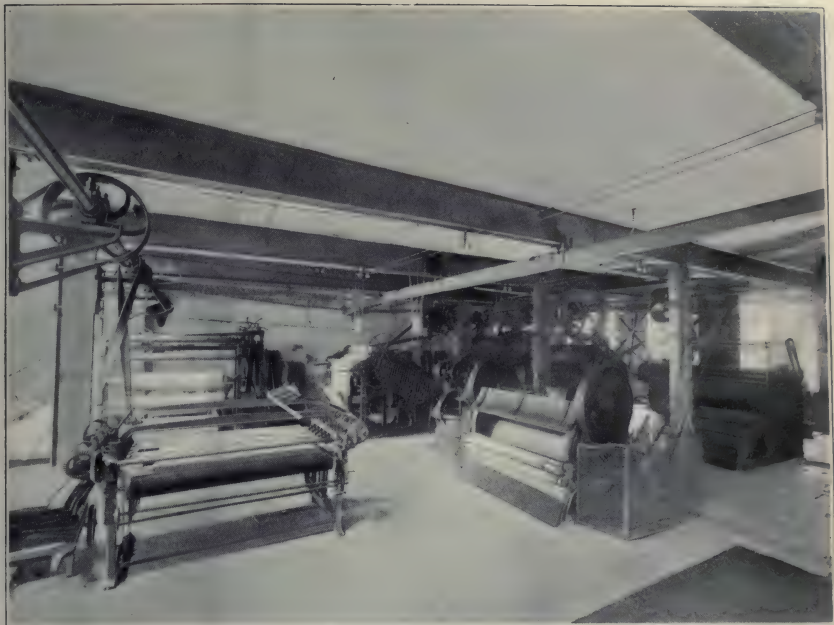
Subject.	Hours per week.	
	First half.	Second half.
FIRST YEAR.		
Experimentation in inorganic chemistry.....	6	2
Experimentation in physics.....	2	6
Experimentation in organic chemistry.....	1	1
Analytical chemistry.....	2	4
Study of textile machinery.....	33	31
Designing and sketching.....		
Practical work.....		
Total, first year.....	44	44
SECOND YEAR.		
Technical chemistry, dyeing and bleaching.....	4	4
Technical analysis of chemicals used.....	1	1
Printing.....	2	2
Raw materials and spinning.....	2	
Weaving.....	2	
Study of finishing machines.....		2
Textile legislation.....		2
Practical work.....	35	33
Total, second year.....	44	44

Finishing department.—In this department practical and theoretical instruction is given for a period of six months in the finishing of woolen goods, especially broadcloth, buckskin, worsted, cheviots, and half-woolen stuffs.

The curriculum and weekly hours of study are, finishing, 8 hours; raw materials and spinning, 2 hours; chemistry and dyeing, 4 hours; finishing machinery, 2 hours; weaving, 2 hours; designing and sketching, 4 hours; textile legislation, 2 hours; practical work, 20 hours; total hours a week, 44.

This completes the study of the four departments of the school. We may now pass to a brief consideration of the special courses offered.

Workmasters' course.—This is a special course connected with the school which is designed for advanced study on the part of those who already possess a knowledge of the subject. It occupies two years. Instruction begins in October, and is given on four week-day evenings from 8 to 10 o'clock, as well as on Sunday mornings. The tuition fees are, for workmasters and merchants or their assistants, 30 marks (\$7.14), for ordinary skilled laborers, 10 marks (\$2.38), for the period of one year. Tuition is paid quarterly. Needy students may be relieved of the payment of a part or the whole of the fee. Those who so desire may receive instruction in arithmetic and German. Foreigners are excluded from this course.

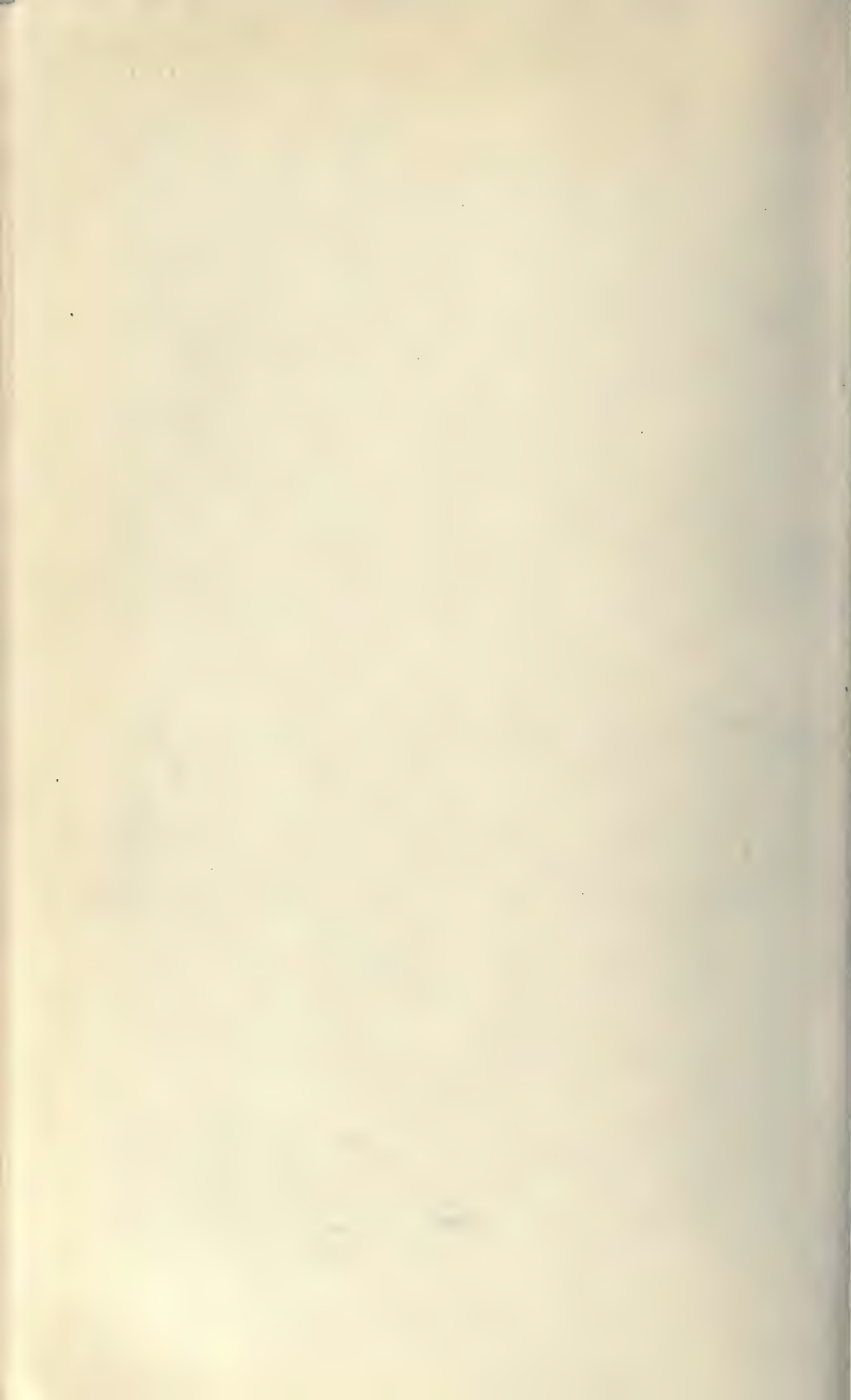


A. DRYING ROOM.



B. FINISHING ROOM.

HIGHER TEXTILE SCHOOL, AIX LA CHAPPELLE, GERMANY.



The curriculum is as follows:

Curriculum of workmaster's course, Aix la Chapelle Textile School.

Subject.	Hours per week.			
	First half year.	Second half year.	Third half year.	Fourth half year.
Binding and patterning	2	2	2	2
Sample making	2	2	2	2
Raw materials	1	1		
Textile engineering	2	2	2	
Practical work	2	2	2	2
Designing				2
Professional arithmetic and bookkeeping	1	1	1	1
Dyeing				1
Textile legislation			1	
Total	10	10	10	10

Course for girls.—Instruction is entirely practical in this course, and consists in the removal and mending of pick-outs and breaks in the thread and related work. This work is done for manufacturers of the town, so that plenty of material for practice is always at hand. The course can be entered at any time. Instruction is given for a period of twelve months. The tuition fee is 2 marks (47.6 cents) a month.

KNITTING SCHOOLS.

As is well known, the German knitting industry is one of the most important branches of the textile industry. German knit goods to the value of many millions of dollars are exported annually, not only to the United States, but to European countries and to the Far East. This great competitive ability of German knit goods is due to three causes: (1) Cheapness of labor; (2) perfection of machinery; (3) skill of the laborers, or, in other words, the thoroughness of the educational facilities provided for the instruction of young men in the knitting trade. Saxony is the greatest center of this industry, and Chemnitz is the heart of the greatest glove and hosiery manufacturing district of the world. Here also are located Germany's greatest and best knitting schools. One of these schools is situated in Chemnitz and the other, which is probably the more important of the two, is located in Limbach, a city of perhaps 16,000 inhabitants, lying about half an hour's ride from Chemnitz. A brief review of the organization of each of these schools will be of interest and value.

KNITTING SCHOOL OF LIMBACH.

Administration.—The knitting school of Limbach stands under the supervision of the Saxon minister of interior. Its immediate control rests with a board of directors. Its organization and activity are determined by special statute. The school derives much importance from its patronage by the State. In this respect it has an advantage over the somewhat similar school of Chemnitz. It is at a disadvantage in that Chemnitz has over 210,000 inhabitants while Limbach has but 16,000. Limbach is, however, a great center for knit goods. Its manufacturers export to all continents. The school has frequently numbered among its students young men from England, the United States, and other countries. While the Limbach school is open to the world, the Chemnitz school restricts attendance to citizens of the German Empire.

Course.—The regular course in the Limbach knitting school occupies one year, and opens in the first week after Easter. In 1899 a half-year's course was added, covering thirty-two hours of practical and six hours of theoretical instruction. An evening course was also arranged, with two hours a week of practical instruction.

Entrance requirements.—The entrance requirements are completion of studies at the public schools (Volksschulen); permission of father or guardian, if the applicant is not of age; proof of adequate education by examination, if necessary, and good character. For participation in the half-yearly and the evening course an age of 18 years is required. From this it is evident that any lad of average intelligence will find no difficulty in entering the school.

Tuition fees.—The tuition fee for the full year's course amounts to 180 marks (\$42.84) for citizens of Saxony, 300 marks (\$71.40) for other Germans, and 600 marks (\$142.80) for foreigners. For the half-yearly course the tuition is 120 marks (\$28.56) for Saxons, 180 marks (\$42.84) for other Germans, and 400 marks (\$95.20) for foreigners. For the evening course tuition is 15 marks (\$3.57) for Saxons, 25 marks (\$5.95) for other Germans, and 50 marks (\$11.90) for foreigners. Hospitanten, or those who are permitted to visit lectures by choice, pay tuition in proportion to the amount of work taken. Saxons pay 10 marks (\$2.38) for every hour a week for a half year; other Germans pay 15 marks (\$3.57), and foreigners 30 marks (\$7.14). All tuition fees must be paid at the beginning of a course.

Materials.—The materials required in the course of study are supplied in part by the school at cost price, but must in the main be purchased by the students themselves. This expense, including books, drawing material, and yarns, amounts to at least 160 marks (\$38.08) a year. All finished goods are the property of the student who makes them. These must, however, be kept in the school until after the annual exhibition arranged by the directors, after which they may be sold. The idea of giving the student the benefit of his work is a very good one, and undoubtedly leads to much more painstaking effort than if all products were to be sold by the directors and the proceeds applied to the defrayal of expenses in the purchase of raw materials.

Curriculum.—Two classes have been formed in the yearly course, designed to meet a difference in scholarship among the students. Those who have already acquired a good knowledge of plane geometry and possess some skill in geometrical drawing constitute division B; the rest constitute division A.

The studies and weekly hours of study in these two divisions are as follows:

Curriculum of Limbach Knitting School.

Division A.		Division B.	
Branch.	Hours per week.	Branch.	Hours per week.
Arithmetic.....	5	Arithmetic.....	3
Geometry and drawing.....	6	Mechanical drawing.....	4
Physics and mechanics.....	2	Mechanics.....	2
Technology of spinning.....	3	Technology of spinning.....	3
Technology of knitting.....	6	Technology of knitting.....	6
Practical work.....	14	Practical work.....	17
Free-hand drawing.....	2	Free-hand drawing.....	2
Bookkeeping.....	2	Bookkeeping.....	2
Total.....	40	Total.....	39

KNITTING SCHOOL OF CHEMNITZ.

Foundation and scope.—For the instruction of the numerous skilled hands required to keep the wheels of the immense hosiery and glove industry of Chemnitz moving, a local organization a number of years ago established a knitting school whose main branch was devoted to the hosiery industry. The institution has proved a complete success, and annually turns out a large number of splendid workmen, so-called "masters" (Meister), who do much to maintain the high competitive ability of the Chemnitz textiles. It is they, largely, who have helped to swell the enormous export of cotton, woolen, and silk hosiery and gloves from Chemnitz to the United States to \$5,000,000 and \$6,000,000 a year.

Curriculum.—The curriculum of this school is divided into a theoretical and a practical part. The theoretical part includes instruction in the following lines: Comparative study of knitting and its related trades, such as plaiting, weaving, knotting; hand knitting, including a study of the tools and machines required, the construction of these machines, and formation of the various kinds of hand-knit goods; machine knitting, including a study of English and French round knitting looms and other mechanical looms, the formation of goods on them, and a thorough study of the construction of mechanical knitting machines.

The practical part of instruction includes work upon hand looms for the manufacture of hosiery, gilets, underwear, gloves, caps; work upon petinet machines for making hosiery, table covers, and shawls; work upon knitting machines of all kinds for the manufacture of hosiery, gloves, and other knit goods; work on English looms for making hosiery and upon French looms for making goods out of which hosiery, underwear, shawls, and certain woven goods are afterward made; work on Paget machines; work on sewing machines and spooling machines. Practical demonstrations by capable teachers enforce the work on machines. Master workmen are always at hand to suggest, aid, and criticise.

Theoretical instruction occupies a very subordinate position, 26 out of 28 hours of study a week in the day course being devoted to practical studies and work.

Day and evening school.—The curriculum, as briefly outlined above, is grouped for two systems of instruction, one for the day and the other for the evening. The day school is in session during the most convenient hours between 8 a. m. and 7 p. m., and continues for a period of half a year. The evening school generally meets between 7 and 9 o'clock, and sometimes from 6 to 8 o'clock in the morning, and continues for a period of one year. The latter is designed especially for the accommodation of those whose days are occupied in earning a livelihood.

Evening school courses.—For the convenience of evening students who have varying amounts of time at their disposal, who desire additional skill in certain lines of work, or who wish to fill out a few breaches in their technical education, four different courses are arranged for the evening school. Course 1 provides for 2 hours a week of theoretical instruction for a period of six months and 2 hours a week of practical instruction for a period of one year. Courses 2, 3, and 4 provide for 2 hours of theoretical instruction a week for a period of six months,

and course 2 provides for 4 hours, course 3 for 6 hours, and course 4 for 8 hours of practical instruction for a period of one year.

Tuition fees.—The tuition fee is 50 marks (\$11.90) for the day course for citizens of Saxony, and 80 marks (\$19.04) for residents of other German States. Tuition in the evening school varies according to the number of hours of practical instruction taken, and is 30, 45, 60, and 75 marks (\$7.14, \$10.71, \$14.28, and \$17.85) for courses 1, 2, 3, and 4, respectively. The fee must be paid in advance of entrance into the course.

Entrance requirements.—The entrance requirements are citizenship in the German Empire, completion of the fourteenth year, and a stainless character.

7. SCHOOLS FOR BUILDERS.

EVOLUTION OF BUILDERS' SCHOOLS.

The first special trade schools to develop in Germany were those intended for the instruction of architects, masons, and carpenters—the schools for builders (*Baugewerkschulen*, *Bauschulen*, etc.). In the earliest schools drawing received most of the attention of teachers, and in many cases occupied practically the whole of the curriculum. All other necessary knowledge of the builder's trade was made incidental to this subject. It is probably difficult for an American to form an adequate idea of the importance attached to drawing in German industrial schools of all classes. Nor is this study given an underserving prominence. The sense of mathematical and geometrical relations, of forms, sizes, and proportions, is a basic requisite in all industrial education. Drawing is a fundamental study in this field, as much so as reading, writing, and spelling. An elementary knowledge of it is a necessary qualification for admission to a trade school. In schools for builders this study obviously has a peculiar application and importance. Hence we find the early schools for builders being organized as branches of drawing schools, of large industrial continuation schools, and of art schools.

It was not long, however, before the value of entirely independent institutions, with special curriculums, special teachers, and, to a large extent, independent buildings, was recognized. Thus arose the specialized schools for builders (*Baugewerkschulen*, *Bauschulen*), and the academies for builders (*Bauakademien*), which, with the development of the builder's trade and the generous patronage of the State and city, soon grew into a valuable system of schools for the mason, the carpenter, and the architect.

The oldest school for builders in Germany seems to have been the one at Munich, established in 1820 as a private school with State and city subsidies, and reorganized as a State institution in 1823. In 1831 a similar school was established at Holzminden. In the interim, from 1837 to 1840, Saxon schools for builders were established at Chemnitz, Dresden, Leipzig, Plauen, and Zittau. In 1845 Stuttgart followed with a like institution, and from then on this class of schools has been increasing rapidly, until to-day they are found scattered in abundance throughout the country.

The aims of the early schools for builders were exceedingly modest. In the main they strove to teach only the most essential knowledge of materials, the common principles of architecture and architectural drawing, and the ordinary method of calculating the cost of plain structures. Because of the undeveloped condition of the trade this was quite adequate. The teachers generally were practical, active carpenters, masons, and architects, who performed the task of teaching as a side issue to their daily work. It is recorded that these schools, primitive as was their organization and method of instruction, met the

needs of the trade; for it must be borne in mind that the art of building has experienced a marvelous development during the last decades, and that in the early part of the nineteenth century it was still in a state of relative simplicity when compared with its bewildering intricacy to-day. Few regulations existed in Germany at that time governing the method of constructing buildings and protecting the public against the erection of buildings under the charge of an incompetent architect. In the earlier part of the century the public made few demands, and the modern detailed and scrupulously correct and minute police regulations governing the construction of all buildings were almost unknown.

The demands which our complex modern, social, political, and industrial life make upon carpenters, masons, and architects are by far more severe than those made in the earlier days. A wonderful change has crept in upon this profession of the builder during the last few decades. Interiors and exteriors of buildings present perplexing problems. Heating plants have been revolutionized and ventilating plants and systems are being changed and improved and more generally introduced. Lighting plants are in a continuous state of change and development. The demands of modern society, from the point of view of architectural conveniences, have grown innumerable. The sanitary police are daily issuing more regulations. The civil and industrial police are daily doing the same. The marvelous development of commerce and industry and transportation are daily calling for larger, more complicated, and more difficult structures. With the improvement and expansion of economic and social life came a call for new public buildings, town halls, churches, schools, museums, and expositions. Private residences are being remodeled and supplied with the latest heating, lighting, and ventilating systems. These and numerous other developments have completely revolutionized the builder's art. His task is no longer simple.

It is a well-known fact that institutions develop with the needs of life about them. The schools for builders grew and expanded with the trade for the instruction of which they had been created. Their curriculums were specialized. What was once taught by one teacher in one course came to be taught by several teachers in several courses. New and independent buildings were erected; new equipments were placed. Professional teachers replaced the so-called practical builders. These teachers were paid regular salaries by the State and pensioned by the State, and ranked with the teachers of other public schools in the statutes of the State. Entrance requirements were raised. To give men who had the making of good builders in them but who lacked the necessary qualifications to enter a regular school for builders an opportunity to acquire a further knowledge of their trade, special preparatory classes (*Vorklassen*) were organized. In addition to this a lower grade of schools (*Polierschulen*) were also established for the instruction of young men who lacked the time or money to complete a regular two-year school for builders, such as will be described presently, and who in addition to this did not possess the necessary preparatory knowledge.

PRUSSIAN SCHOOLS FOR BUILDERS.

Organization.—All the Prussian schools for builders were organized under common statute in 1899. Their entrance requirements, curriculums, and final examinations were prescribed in minute detail by a

special ordinance issued by the Prussian minister of commerce and industry. Originally sentiment seems to have favored the establishment of these schools as city institutions (*Kommunalanstalten*) with State control. Later it was, however, found wiser to establish them as State institutions (*Staatsanstalten*) with direct and immediate instead of indirect control. While the cities were to give their financial support to the schools the State was to guarantee their maintenance, and is now annually distributing liberal subsidies. Under State direction a common organization could be given to all these institutions. The unveiled advantages of this change led to the establishment of the present uniform system of schools. Only three schools, those at Berlin, Cologne, and Magdeburg, remain city institutions. All new schools must be organized in accordance with the ordinance of 1899.

Courses.—Considerable debate was called forth by the question whether a three-course or a four-course school ought to be established. Each course represents one semester, so that the problem turned on a two-year or a one-and-a-half-year school. Builders' associations busied themselves with the proposition, and a two-year curriculum was finally decided on as the best. It was argued that the one-and-a-half-year course offered too little time for practical work in drafting structures and making analyses of buildings by means of drawings.

Entrance requirements.—For entrance into the Prussian schools for builders an age of 16 years is required. The common school course must have been completed, and the applicant must have been engaged for at least two summers (*Bausommer*) in the practical pursuit of the trade as an apprentice or assistant to a trained mason, carpenter, or architect. In addition to this an entrance examination is required covering German, arithmetic, and plane geometry. Familiarity with the elements of drawing must be shown in the preparation of a piece of work in drafting.

These requirements are sufficient to exclude all those who could not with profit pass two years in the study of the trade, and they are not too severe for any fairly bright lad to pass, even though he may lack good preparatory training. Experience has proved their wisdom, for the presence of unqualified students was found to interfere with the proper conduct of the work. Every year a number of applicants are turned away through failure to pass the tests. For those of this number who wish to obtain some training in the profession, preparatory classes (*Vorklassen*) have been provided, as has been already stated. After taking a course of work in a class of this kind the student is qualified for admission into the regular two years' work of the builders' school.

Curriculums.—The ordinance of the Prussian minister of commerce and industry, issued in 1899, made provision for the introduction of a uniform curriculum of study (*Normallehrplan*) for all the schools for builders in Prussia. Provision is made for four classes, each occupying one semester. From the time of admission the courses are designated by numerals, as fourth class, third class, second class, first class. The following outline of the curriculum of the department for above-ground building shows the subjects taught, the number of hours devoted to each in one week, and the time of the course when each is taught:

Fourth class, first semester—German language, 2; arithmetic, 2; algebra, 4; plane geometry, 4; natural science, 2; descriptive geom-

etry, 6; science of architecture (stone and wood), 16; architectural styles (Formenlehre), 4; free-hand drawing, 4; penmanship, 1; modeling, 4; total hours in a week, 49.

Third class, second semester—algebra, 3; stereometry and trigonometry, 4; natural science, 2; building materials, 3; descriptive geometry, 4; statics, 4; science of architecture, 12; architectural styles, 4; free-hand drawing, 4; practical architecture (Baukunst), 4; modeling, 4; total hours in a week, 48.

Second class, third semester—natural science, 2; descriptive geometry, 4; architectural strength and resistance, 5; science of architecture, 12; practical architecture, 5; architectural drafting, 8; architectural estimates, 2; architectural styles, 4; surveying and leveling, 2; modeling, 2; Samaritan course (per semester), 12; total per week, outside of the Samaritan course, 46 hours.

First class, fourth semester—building materials (review), 1; descriptive geometry, 2; statics, strength, and resistance, 4; science of architecture, 6; practical architecture, 8; architectural drafting, 14; architectural estimates and conduct of work, 2; architectural styles, 4; architectural ordinances and legislation, 2; bookkeeping, 1; total hours in a week, 44.

Samaritan course (Samariter-Kursus) covers instruction in the care of the body, treatment of wounds, and first aid to the wounded. The practical value of such a course can be readily perceived, for in no trade are unexpected accidents commoner than in that of the builder.

The foregoing curriculum is designed for instruction in the department for aboveground building (Hoch-Bauabtheilung). It was found soon after the reorganization of the schools for builders that a course as given above failed to provide sufficiently for instruction in the special and difficult trade of underground building, such as is required for ground and highway building, hydraulic and bridge building, railroad building, etc. A special department, known as the department for underground building (Tief-Bauabtheilung), was hence organized in connection with many of the schools for builders. As in case of the departments for aboveground building, the course occupies two years and is divided into four progressing classes. During the first year (classes four and three) instruction is the same for both departments. During the second year the following curriculum is adhered to:

Second class, third semester—natural science, 3; plane drawing, surveying, and leveling, 6; mathematics, 4; descriptive geometry, 2; science of architecture, 7; architectural strength and resistance, 4; substructure engineering, 4; hydraulic engineering, 7; bridge building, 2; railroad building, 4; substructural drafting, 4; Samaritan course in the semester, 12; total hours in each week, 47.

First class, fourth semester—plane drawing, surveying, and leveling, 6; building materials, 2; statics, strength, and resistance, 4; mechanical engineering, 2; road building, 2; hydraulic engineering, 8; bridge building, 6; railroad building, 6; architectural ordinances and legislation, 2; architectural estimates and conduct of work (Veranschlagen und Bauführung), 3; bookkeeping, 1; total hours each week, 46.

Examinations.—For the examination of students graduating from the department for aboveground building an examining board has been provided, consisting of the following members: (1) A commissioner of the Prussian Government; (2) a member of the board of

regents (Kuratorium) of the school; (3) the director of the school; (4) those teachers who gave instruction in the branches covered by the examination; (5) two master builders (Baugewerkmeister).

For the examination of students graduating from the department for underground building (Tief-Bauabtheilung) provision is made for an examining board, consisting of (1-4) the first four members of the preceding board; (5) a representative of the Prussian railroad administration; (6) a city official engaged in the bureau for underground building; (7) a practical underground builder.

Students are marked on (1) their daily class work; (2) their written examination; (3) their oral examination. The written examination occupies, in the department for aboveground building, nine days of eight hours each, and in the department for underground building, eight days of eight hours each. It is apparent that ample opportunity is given for the display of strength or weakness on the part of the student. At the same time such comprehensive examinations afford a splendid opportunity to test the thoroughness and efficiency of the curriculum and the competence of the instructors. An examining board as eminently practical as the one described can readily perceive the points of success and failure in the organization of an institution the graduates of which are under its cross-examination for seventy-two hours. Nor is it at all likely that unqualified or listless students will escape the vigilance of the board.

The oral examination is conducted by the teachers in the presence of the board. Any member of the examining board may ask questions. Not more than 10 students may be examined at the same time.

Attendance.—The total attendance at the Prussian schools for builders during the winter semester of 1901-2 was 4,986, as against an enrollment of 2,165 during the winter semester of 1891-92. The number of students had, therefore, more than doubled in ten years.

Tuition fees.—The tuition fees required for study at German schools for builders vary from 30 marks (\$7.14) a semester to 100 marks (\$23.80) a semester. At Berlin, which remains a city institution, the fee is 100 marks a semester, or course, and hence 400 marks (\$95.20) for the two years' work. Cologne exacts the same amount. The Goerlitz school requires a fee of 80 marks (\$19.04) a course, that is, one-half year; the Passau school (Bavaria) imposes a fee of 35 marks (\$8.33) for the same period, and the school at Munich charges 30 marks (\$7.14) a half year. The eminence of a school must not be erroneously judged from the size of the fee which is imposed, as some schools can get along on comparatively small fees because of liberal subsidies granted to them by the city in which they are located or by the State.

LOCATION OF SCHOOLS FOR BUILDERS.

Schools for builders are found scattered very liberally throughout the German Empire. They are annually increasing in numbers and are annually raising their standard of work. Below are enumerated all the leading institutions of this class. The list will give the reader some idea of their number and their distribution among the various members of the Empire.

Prussia.—Schools with departments for underground building: Breslau, Buxtehude, Deutsch-Krone, Nienburg, Posen, Frankfort on the

Main, Stettin (and Polierschule), Kattowitz, Münster, Aix la Chapelle, and Erfurt. Schools without departments for underground building: Berlin, Eckernförde, Höxter, Idstein, Magdeburg, Königsberg, Görnitz (with department for stone cutting), Cologne (with Polierschule), Cassel, Barmen, and Hildesheim. All these schools are open both in winter and in summer.

Bavaria.—Munich, Nuremberg, Augsburg, Kaiserslautern (departments for builders are also found associated with the industrial schools located in these four cities) Regensburg, Bamberg, and Würzburg. All the Bavarian schools confine their work to the winter semester. Schools for sculptors are also located at Metten, Büchelberg, Wunsiedel, and Miltenberg.

Saxony.—Chemnitz, Dresden, Plauen, Zittau (with department for underground building). The Zittau school is in session both winter and summer; the others are only open during the winter.

Württemberg.—Stuttgart, with a special department for hydraulic engineering. There are summer and winter sessions.

Baden.—Karlsruhe, with a department for underground building; summer and winter sessions. There is also a Polierschule for masons and carpenters at Freiburg connected with the local trade school.

Other States.—Schools are found in other members of the Empire at Darmstadt (with department for underground building), Bingen, and Offenbach (all with summer and winter sessions); at Holzminden (with summer and winter sessions); at Coburg and Gotha; at Weimar (with only winter sessions); at Zerbst; at Strassburg (with department for underground building); at Hamburg (with summer and winter sessions); at Bremen (with department for underground building and both summer and winter sessions); at Lubeck (with department for underground building and summer and winter sessions).

Aside from the schools enumerated above there are a considerable number of private schools for builders, which, however, are reported to maintain an inferior standard of work. Opportunity is also given for the study of the builder's profession at schools for mechanics (Handwerkerschulen), at schools for industrial art (Kunstgewerbeschulen), and at the larger continuation schools (Fortbildungsschulen), and guild schools (Innungsschulen). The main preparation for the builder's trade obtained in the latter institutions is in the line of professional drawing, together with the auxiliary studies of mathematics, geometry, and, in some instances, trigonometry.

It is apparent from the foregoing that Germany is already very liberally supplied with institutions for the instruction of the carpenter, the mason, and the architect. From these schools go forth all the leading constructing engineers of the country. They are found in all the various States. They erect all the magnificent Government buildings, they build the Government railroads, they construct the bridges, the waterworks, the lighting plants, and they bring to their tasks a thorough knowledge of all that is most modern and most serviceable to the builder's trade. Their scientific, careful, and correct work has laid the foundation for all those substantial and architecturally beautiful structures which meet the eye of the foreigner in all parts of the country.

8. ENGINEERING SCHOOLS OF PRUSSIA.

ORIGIN AND DEVELOPMENT.

The German engineering schools (*Maschinenbauerschulen*) are of comparatively recent origin, the first independent school of this group in Prussia having been established at Einbeck in 1871. Before the establishment of the special institutions mechanical engineers, mining engineers, electricians, etc., were educated at trade schools (*Gewerbeschulen*), industrial schools (*Industrieschulen*), higher polytechnic schools (*Oberrealschulen*), polytechnic schools (*Realschulen*), builders' schools (*Baugewerkschulen*), and other technical schools. In most cases special departments for mechanics had been organized at the institutions enumerated, and not infrequently these departments have been retained until the present day.

Many of the present engineering schools developed out of the schools for builders, which were the subject of discussion in the preceding paper. The departments for engineering were separated from these schools and organized as independent institutions. The Prussian Government also began the establishment of so-called workmaster schools (*Werkmeisterschulen*), and soon after technical middle schools (*technische Mittelschulen*), for the instruction of mechanical engineers. In 1898 the workmaster schools were reorganized under the name of "*Maschinenbauerschulen*," or engineering schools, and the technical middle schools were called "*hoehere Maschinenbauerschulen*," or higher engineering schools.

The value of instruction in independent engineering schools became especially apparent after the establishment of the first institution of this class at Einbeck in 1871. Moreover, the need of such schools increased rapidly with the marvelous development of the great iron industry of Prussia. The call for well-trained mining, mechanical, and electrical engineers increased rapidly from year to year. The Prussian Government extended a fostering hand. With the aid of its subsidies and with additional material aid from large cities, mining associations, guilds, etc., the engineering schools developed rapidly, until to-day they offer the highest standard of instruction to be had in this field. A development very similar to that sketched above obtained in the other members of the Empire. It is through these institutions as mediums that all the available powers of scientific knowledge and research are directed upon the vast and expanding problems of the iron industry. It is these schools that have made the products of German foundries and machine shops famous in all countries. To-day Prussia alone can boast of higher engineering schools (*hoehere Maschinenbauerschulen*) at Dortmund, Hagen, Breslau, Elberfeld, Stettin, Posen, Altona, Einbeck, Aix-la-Chapelle, Cologne, and Kiel, while lower engineering schools (*Maschinenbauerschulen*) are

found in Dortmund, Duisburg, Elberfeld, Gleiwitz, Goerlitz, Cologne, Magdeburg, and Hanover.

In many localities, where the industries of the region make it expedient, schools for metallurgy (Hüttenschulen) are associated with the regular engineering schools. Not infrequently evening and Sunday schools for engineers, locksmiths, and metallurgists are also provided for those who lack the means or time for a regular two years' course.

AIMS.

The higher engineering schools are intended to offer instruction and training for those who desire to take positions as constructing and supervising engineers in the largest machine shops, and who are educated to conduct successfully the highest grade of engineering enterprise. These schools also supply the directors and owners of Germany's great machine works.

The lower engineering schools offer a training for positions among the lower ranks of constructing and supervising engineers. They supply the superintendents of smaller machine shops and factories, and recruit the ranks of workmasters, mechanics, and foremen of secondary foundries. Whether it is wise to enter the one or the other class of school depends entirely upon the determined career and the capacity of the engineer. Each grade of school fulfills an important mission and supplies a certain branch of the iron industry with men who know all that is necessary in their positions, who are not given a training either too advanced or too meager for the task that is waiting for them. It was found that one class of schools taught either too much or too little, according as the position was simple or difficult. To-day the two grades of institutions just described are reported to meet the call of the industry quite satisfactorily.

The evening schools also occupy an important position. In every locality there are men of narrow circumstances who can not afford a two years' education or leave their work during the daytime. Yet many of this number possess natural ability for the profession, and, with a little extra theoretical instruction and explanation of the scientific principles that underlie all the problems which come to their attention for solution, will develop into valuable mechanics. It is a memorable fact that the German industrial schools almost invariably remember the needs of the poorer class of artisans, and give the thrifty an opportunity to improve themselves by attending evening schools or Sunday schools. A visit to such a school speaks eloquently for its wisdom and practicability.

ENTRANCE REQUIREMENTS.

For admission into the higher engineering schools one must possess a certificate of graduation from the Unter-Sekunde of a school. The Unter-Sekunde is a preparatory course which students may enter from the common schools between the age of 10 and 14 years, in order to lay the foundation for the study of some profession. The graduate of the Unter-Sekunde can enter the German gymnasium, which is considered in Germany to be the equivalent of the undergraduate course at an American university.

The writer, however, believes that the requirements for admission into the freshman courses of the American universities are more severe than those demanded for entrance into a German gymnasium. In any event it is clear that the graduate of the Unter-Sekunde has already acquired a good foundation for the study of a trade, and can absorb the work at the higher engineering schools to the best advantage. Any applicant for admission to a higher engineering school who has not finished the Unter-Sekunde may be matriculated in case he can produce proof of an education in some advanced school which is an equivalent to the Unter-Sekunde. In addition to this, proof must be given of a fair familiarity with the principles of drawing and reasonable skill in drafting. Most important of all is the requirement that no applicant may be admitted who has not had two years of practical experience in a machine shop. Where no advanced school has been attended the applicant must submit to an examination, and may on its successful completion be admitted only in case he has had three years of practical experience in a machine shop (Werkstatt-Thätigkeit).

For entrance into the lower engineering schools the applicant must have completed the common schools (Volksschule) and have had at least four years of practical experience in a machine shop. Attendance at some good industrial continuation school prior to entry into a lower engineering school is strongly recommended. For entrance into the schools for metallurgy the same requirements are imposed as in case of the lower engineering schools.

The value of a previous practical employment before entering an engineering school can not be overestimated. The student comes to his work fresh from the workshop, filled with practical knowledge, and deeply imbued with the reality of the problems of his profession. In view of the fact that instruction at the engineering schools is so deeply theoretical, a previous practical experience is a necessity if the best results of the work are to be realized.

LENGTH OF COURSE.

The higher engineering schools call for two years of study. There are four classes of one semester each which are numbered with the progression of the course as class 4, class 3, class 2, and class 1. Some of the lower engineering schools also occupy two years, while others cover the ground in one year and a half. The schools for metallurgy require two years of study.

CURRICULUMS.

Below are presented in outline the curriculums of the engineering schools which give a two-year course, which will enable the reader to see at a glance what branches are taught, how much time is devoted to each branch, and in what semester the work falls.

Curriculum of engineering schools with two-year course.

Subject.	Hours per week.				
	Fourth class, ^a	Third class, ^a	Second class, ^a	First class, ^a	Total.
HIGHER SCHOOLS:					
Business practice.....				2	2
Mathematics.....	8	4	4	2	18
Physics.....	4	2			6
Chemistry.....	4				4
Mechanics.....	6	5	4	2	17
Machine parts.....	4	4	2	1	11
Boilers.....			2	2	4
Levers.....			3	3	6
Engines.....			3	2	5
Hydraulic motors.....				3	3
Gas motors.....				2	2
Machine tools.....		4			4
General technology.....			4	2	6
Metallurgy.....		2			2
Electrotechnics.....		4	3	2	9
Constructive engineering and drafting.....	4	3	3	2	12
Estimating.....				1	1
Descriptive geometry.....	6	4			10
Drafting of machine parts.....	6	6	6		18
Drafting of boilers.....				4	4
Drafting of levers.....			2	4	6
Drafting of engines.....			2	4	6
Drafting of machine tools.....		4			4
Laboratory practice.....			4	4	8
Samaritan course ^b			1		1
Total.....	42	42	43	42	169
LOWER SCHOOLS:					
German.....	6	2			8
Business law and practice.....			2	2	4
Arithmetic.....	6	2			8
Mathematics (practical).....	7	6	4	2	19
Physics.....	4	2			6
Chemistry.....		2			2
Mechanics.....		5	4	2	11
Electrotechnics.....		4	3	3	10
Machine parts.....		6			6
Boilers.....			3		3
Levers.....			4		4
Engines.....				4	4
Hydraulic motors.....				2	2
Gas motors.....				1	1
Machine tools.....			3		3
Metallurgy.....			2		2
General technology.....			3	4	7
Constructive engineering.....			2	2	4
Estimating.....				1	1
Geometrical drawing, technical free-hand drawing, and projecting.....	18	3			21
Drafting of machine parts.....		10	4	2	16
Drafting of boilers.....				4	4
Drafting of levers.....				5	5
Drafting of engines.....				4	4
Drafting of machine tools.....			4		4
Correspondence.....	1				1
Laboratory practice.....			4	4	8
Samaritan course.....			1		1
Total.....	42	42	43	42	169

^a First, second, third, and fourth semesters, respectively.^b The "Samaritan course" (Samariter-Kursus) treats of hygiene, care of body, treatment of wounds, and first aid to the injured. It is a very common and praiseworthy fact that the German industrial schools do not neglect this necessary subject of the health and preservation of the human body.

From the outline presented below it will be seen that the lower engineering schools which have a course of one year and a half have their curriculums divided into three classes—the preparatory class, the lower class, and the upper class (Vorklasse, untere Fachklasse, obere Fachklasse). Each of these classes is equivalent to one semester, while each semester is again divided into two study divisions of ten weeks each.

Curriculum of lower engineering schools with one and one-half-year course.

Subject.	Hours per week.					
	Preparatory class.		Lower class.		Upper class.	
	First ten weeks.	Second ten weeks.	First ten weeks.	Second ten weeks.	First ten weeks.	Second ten weeks.
German.....	8	8	2	2		
Arithmetic.....	8	8	2	2		
Penmanship.....	2	2				
Geometrical drawing.....	22		6			
Technical and free-hand drawing.....		22				
Stereometry (Raumlehre).....	6	6				
Physics.....			4	4		
Chemistry.....			4			
Electrotechnics.....					4	4
Mathematics.....			8	4		
Mechanics and resistance.....				8	4	4
Machine parts.....			18	18		
Machine tools.....				6	10	
Boilers and heating.....					16	
Motors.....						16
Levers.....						16
Technology.....				4	4	
Bookkeeping and estimating.....					4	
Constructive engineering.....			4			
Engineering legislation.....					2	2
Laboratory practice.....					4	4
Samarian course.....						2
Total.....	46	46	48	48	48	48

Below is presented the curriculum established for the Prussian schools for metallurgy (Hüttenschulen), which are frequently found associated with the engineering schools. The course occupies two years of four classes.

Curriculum of schools for metallurgy.

Subject.	Hours per week.				
	Fourth class.	Third class.	Second class.	First class.	Total.
German.....	6	2			8
Business practice and legislation.....			2	2	4
Mathematics.....	13	8	4	2	27
Physics.....	4	2			6
Experimental chemistry.....	4	4			8
Mechanics.....		4	2	2	8
Electrotechnics.....		2	2	2	6
Theory of combustion.....		4			4
Chemical technology.....			4		4
General science of metallurgy.....		2			2
Metallurgy of iron.....			6	4	10
Metallurgy of other metals.....				4	4
Mineralogy.....		2	2		4
Analytical chemistry.....			8	8	16
Mechanical technology.....				8	8
Engineering.....		4	3	2	9
Bookkeeping.....			1		1
Calibration of rollers.....				8	8
Technical free-hand drawing.....	11	4			15
Geometrical drawing and projection.....		4	4	4	12
Mechanical and metallurgic drafting.....	1				1
Vertical writing.....			4	4	8
Laboratory practice.....			1		1
Samarian course.....					
Total.....	42	42	43	50	177

FINAL EXAMINATIONS.

Having completed the work of the last semester, the student is required to submit to an examination before he receives a certificate of graduation. This final examination is held by a commission regu-

larly appointed by the Government (Regierungs-Prüfungs-Commission). The procedure at these examinations, the subjects of examination, the formalities antecedent to the examination, and other matters are prescribed in minute detail by ministerial ordinance. Six grades of censure are given out, as follows: Excellent, very good, good, fair, bad, very bad. The rank given by the examining board is entered upon the diploma of the graduate. The possession of this diploma opens up a wide field for activity either in the Government service or in leading private concerns.

TUITION FEES.

The tuition fees of the Prussian schools are uniformly 150 marks (\$35.70) a year. The engineering schools at Cologne and Magdeburg, which continue as city institutions with Government subsidies, have somewhat higher fees, the fee for the Cologne school being 200 marks (\$47.60) a year. The tuition fees imposed in lower engineering schools are about 60 marks (\$14.28) a year on the average.

ATTENDANCE.

The following figures give the reader some idea of the importance of the Prussian engineering schools:

Attendance at Prussian engineering schools.

Location of school.	Attend- ance.	Location of school.	Attend- ance.
Dortmund	586	Görlitz	200
Elberfeld	258	Remscheid	76
Breslau	145	Iserlohn	101
Hagen	199	Stettin	206
Duisburg	244	Einbeck	48
Gleiwitz	125	Siegen	42
Altona	92	Cologne	205
Magdeburg	104		

The above-named leading schools of Prussia were thus attended by 2,639 students in the year 1901-2.

OTHER ENGINEERING SCHOOLS.

Failure to include in the preceding discussion references to the engineering schools of other members of the German Empire must not be construed as arguing for their relative unimportance, but is due solely to a lack of sufficient reliable data on these schools. In Saxony, Württemberg, Bavaria, and elsewhere are found some of the most advanced and best equipped engineering schools of the country. Everywhere is manifest the same fostering care of the Government. Everywhere these institutions are rapidly increasing in numbers and efficiency, for during the thirty years of their existence they have eloquently proved their right to be, through the eminence of their scholars in the German engineering world and the marvelous expansion of the markets for German machinery in all quarters of the globe.

A training for the engineering profession is, in addition to that offered in the independent schools discussed above, also given in departments for engineering associated with many of the schools of technology (Technika) which are found in liberal numbers throughout the Empire.

9. SCHOOLS OF TECHNOLOGY.

ORGANIZATION.

The German technikum, which in the United States would probably be called school of technology, is distinguished from the various groups of schools which have already been discussed in that it aims to teach not one single trade but a number of trades. The technikum is a composite institution. It is made up of a number of distinct trade schools, each of these schools forming an independent department in the institution. For example, the technikum of Bremen consists of five departments, each department being designed for education in a particular trade as follows: Department A, for builders (Baugewerkschule); department B, for engineers (Maschinenbauerschule); department C, for shipbuilders (Schiffbauerschule); department D, for steamboat engineers (Seemaschinistenschule); department E, for gasworkers (Gasmeisterschule).

The departments which are represented in a given technikum are determined to a large extent by the needs of the industry which flourishes in the locality in which the school is situated. Thus, the commercial interests and shipbuilding yards of Bremen call for training schools for navigating engineers and shipbuilders. The technikum of Lemgo has, in addition to a number of other departments, a department for brickmaking, to meet the demands of the local brickmaking industry. Another factor which is of great importance in determining into what departments a given technikum is to be divided is the question of the relation of the trades which are to be taught. Trades which have little in common with each other could not wisely be included in one technikum. Thus, one would hardly expect to find departments for engineering, for textile education, and for brickmaking in a technikum consisting of three departments. The aim in organization seems to have been the grouping in one institution of trades which bear a close relation to one another, so as to admit of a duplication of courses, teachers, and equipment. In the instance just presented the three trades have so little in common as to require their own specific equipments, curriculums, teachers, and general organization, if the work is to be efficiently prosecuted. On the other hand, it is apparent that a wise economy can be effected by the grouping of closely related trades under a common organization. The mechanical and electrical engineer, the metallurgist, the builder, the mechanic—all these must follow studies and use laboratories which have much in common. One teacher can supervise the work in drawing, and another can teach chemistry, or physics, or any other common branch. This grouping of correlated trades in one institution seems, thus far, to be an eminent success in Germany.

From the following presentation some idea can be gained of the nature of the grouping of trades in the leading technikums of the country. Each institution is referred to by giving the name of

the city in which it is located, followed by the departments of which it is constituted: Altenburg, mechanical and electrical engineering, general technology; Aschaffenburg, mechanical and electrical engineering, building; Berlin, same as Aschaffenburg, but including three grades of work covering six, four, and two semesters, respectively; Bingen, mechanical and electrical engineering, with three grades of work covering five, two, and two semesters of work, respectively; Cöthen, mechanical and electrical engineering, mining and metallurgy, ceramics, brickmaking, gas working; Kyffhäuser technikum at Frankenhäusen, mechanical and electrical engineering, building; Hainichen, mechanical engineering, electrotechnics, and mechanics, with two grades of work of five and two semesters, respectively; Lemgo, engineering, building, general mechanics, brickmaking; Limbach, mechanical and electrical engineering, with two grades of work covering six and three semesters, respectively; Mittweida, mechanical and electrical engineering, mechanics, and electrotechnics; Stadtsulza, mechanical and electrical engineering, general mechanics, building, and cabinetmaking.

Many of the technikums are practically engineering schools, as can be seen from their departments, which confine themselves to engineering subjects. Some, in fact, though classified as technikums, have assumed the title "Ingenierschule," as, for example, the institutions at Mannheim and Zwickau. Here we find a singular exception to the definite nomenclature employed throughout the entire German educational system. In most cases the technikums offer two grades of work in each department, a higher course (höhere Kursus) and a middle course (mittlere Kursus). The higher course generally covers from five to six semesters, and the lower course from two to four semesters.

ENTRANCE REQUIREMENTS.

On the basis of entrance requirements and the general grade of work offered, the German schools of technology are divided into two classes, higher schools of technology (höhere Technika), and middle or secondary schools of technology (mittlere Technika). There is no uniformity in the entrance requirements for technikums located in the various members of the German Empire. As a rule, the completion of the sixteenth year, and sometimes the fifteenth year, is required for admission to the higher technikums. This enables the applicant to either complete the course of a higher citizens' school (höhere Bürgerschule) at 14, or a Progymnasium, Real-Progymnasium, or Real schule at 16 years. The latter three kinds of schools are secondary institutions with six-year courses which are classical, semiclassical, and nonclassical or modern, respectively, in that they emphasize Latin and Greek, Latin only, or modern languages, in their curriculums. A boy can hence lay a broad foundation of general culture before entering the specialized technikum, for the institutions named above maintain absolutely unspecialized curriculums for the dispensation of a general education. Emphasis is also placed upon previous practical employment in the trade which the applicant desires to learn, though some technikums do not impose practical experience as an entrance requirement. Many mooted questions continue to surround the organization of the German technikum. This institution is one of the present generation, and even of the last decades, and presents that uncertainty in organization which characterizes the experi-

mental stage in development. The curriculums of the technikums are constantly being remodeled, and there is a strong tendency toward greater uniformity in entrance requirements and studies.

TUITION FEES.

The tuition fees vary considerably, and apparently without any vital relation to the grade of work offered, except that in one and the same institution the fees for admission to the higher course are markedly higher than for the lower course. At the technikum of Bingen the fee is 120 marks (\$28.56) a semester; at Bremen it varies from 15 marks (\$3.57) to 500 marks (\$119) a year, according to the kind of work taken; at Gera the fee ranges between 100 marks (\$23.80) and 150 marks (\$35.70); at Strelitz it is 360 marks (\$85.68) a year.

LEADING HIGHER TECHNIKUMS.

Below is given a list of the leading higher technikums of Germany. No complete list of these institutions is available. The letters (a), (b), and (c) added to the name of the place at which the technikum is located tells whether special courses are provided for (a) electrotechnics, (b) chemistry, (c) over- and underground building:

Location of leading higher institutes of technology in Germany.

Altenburg (a, b).	Lemgo (c).
Aschaffenburg (a).	Limbach (a).
Berlin (a, c).	Mannheim (a, b).
Bingen (a).	Mittweida (a).
Cöthen (a, b).	Neustadt (a).
Frankenhausen (a, c).	Stadtsulza (a, c).
Friedberg (a, b, c).	Sternberg (a).
Hainichen (a).	Strelitz (a, c).
Ilmenau (a).	Zwickau (a).

These institutions are all under State supervision and receive either State or city subventions, or subsidies from both. Graduating examinations are given by Government commissions, and diplomas are conferred.

10. MINING SCHOOLS.

GROWTH OF MINING SCHOOLS.

Among the earliest special trade schools established in Germany must be ranked the schools for instruction in the mining industry. The now famous school for mining at Clausthal, in the Harz Mountains, was the pioneer in this field, and had its origin in 1811. Soon after the establishment of this school there followed similar institutions at Bochum (1816), Essen and Eisleben (1817), Siegen (1818), Saarbrücken (1822), Tarnowitz (1839), and Waldenburg (1848). From that time the number of schools increased gradually, until to-day Prussia can boast of 10 mining schools with two-year courses and 43 preparatory schools, while important schools of this class are also found in all the other members of the Empire.

REORGANIZATION OF PRUSSIAN MINING SCHOOLS.

In 1851 a movement for the reorganization of the mining schools was instituted by the Prussian minister of commerce and industry. The active prosecution and supervision of the work was placed in the hands of his private adviser, Von Carnall, who may justly be called the father of the present efficient system of mining schools. Von Carnall presented to the public his views as to what constituted the best organization of the schools in the form of a comprehensive and voluminous memorial. His recommendations were adopted almost in their entirety in the years 1853 to 1857. In harmony with the tendency toward the local supervision and control of educational institutions, the direction and management of the mining schools was placed in the hands of local interested bodies, such as mining aid funds (*Bergbau-Hülfskassen*) and mining school associations. The local administrative body known as the *Schulkuratorium* was vested with the power to determine the curriculum and general course of study, to engage and discharge teachers, to determine entrance requirements, to equip the schools, and to perform such other important and essential functions as are incident to the management of mining schools. It is only in those cases where the State remains interested in a mining school by virtue of a material investment or annual subsidy that it retains a share of influence. In general, the *Kuratorium* seems to have absorbed all the vital powers of direction and management.

ENTRANCE REQUIREMENTS.

Most important of all the requirements for admission to a regular course of two years at a mining school is that the applicant must have had at least two years of practical experience in the industry prior to his entrance into the school. His connection with some mining institution during this period must have been more than a mere formal employment or office clerkship. He must have been actively engaged

in manual work in the various branches of the industry, so as to be familiar with the practical problems and duties associated with his profession. In case the applicant lacks such experience he has the privilege of passing one year in the employ of a mining concern, and then entering a preparatory mining school (Vorschule) for another year. After the successful completion of these two years' work he is admitted into the regular course. As will be seen later, most of the German mining schools have Vorschulen associated with the regular course.

The educational requirements include successful completion of the common school course and a knowledge of the fundamentals in drawing. The latter is necessary in order to avoid waste of time in the regular course, in which drawing is an important study. Hence the entrance requirements are such that any lad of average capacity will find no difficulty in availing himself of the opportunity of an education in this line.

CURRICULUMS.

The course of study at the regular mining schools occupies two years and includes the following branches: Drafting, penmanship, German, arithmetic, geometry, plane trigonometry, general surveying, mine surveying, science of mining, orology, and, in many schools, chemistry, physics, engineering, architecture, and accounting. When we remember that everything that the German does is accomplished with system and thoroughness and that in the method of instruction due consideration is given to the highest pedagogic principles, we can hardly fail of the conclusion that a course of two years' study in the above branches, even though begun by boys with but a comparatively meager educational preparation, will develop capable miners and bring to the aid of the German mining industry men in whom has been planted a sound scientific aspect of their trade. The previous practical experience provides a fertile soil for the reception of the theoretical and scientific matter presented in the schools, and insures the assimilation of abstract professional knowledge without obscuring the eye to the essentially practical nature of the problems involved in the trade.

LOCATION OF MINING SCHOOLS.

The leading mining schools (Bergschulen) of Prussia with two-year courses are situated at the following places: Tarnowitz, Waldenburg, Eisleben, Clausthal, Bachum, Essen, Saarbrücken, Siegen, Dillenburg, and Bardenberg. In addition to the foregoing, preparatory schools (Bergvorschulen) are at the following places: Waldenburg, Gottesberg, Reussendorf, Neurode, Schlegel, Petrykowitz, Görlitz, Eisleben, Halle, Senftenberg, Strassfurt, Clausthal, Obernkirchen, Aplerbeck, Dortmund, Castrop, Witten, Herne, Bochum, Linden, Sprockhövel, Schalke, Gelsenkirchen, Kupferdreh, Katernberg, Altensen, Barbeck, Oberhausen, Kamen, Eickel, Buer, Recklinghausen, Bottrop, Meiderich, Louisenthal, Sulzbach, Neunkirchen, Siegen, Wetzlar, Kohlscheid, Eschweiler, Pumpe, Grube Maria, and Grube Nordstern.

ATTENDANCE AND TEACHERS.

The total number of students enrolled at the 10 mining schools enumerated above was 1,163 in 1901, and the number of teachers was

83. The total attendance at the 43 preparatory schools given above was 962 in 1901, and the number of teachers was 116.

The leading mining schools of Prussia are the two great academies for mining (Bergakademien) at Berlin and Clausthal. The attendance at the Berlin Academy was 212 in 1901, and at Clausthal 232 in 1903. There are also departments for mining and for metallurgy connected with the technical high school of Aix la Chapelle; in 1902 the division for mining was attended by 86 students, and that for metallurgy by 117.

CLAUSTHAL ACADEMY FOR MINING.

History.—The Clausthal Academy for Mining is generally conceded to be the best institution in Germany for instruction in the mining industry. Although this school was not established as an independent institution until 1811, its origin can be traced as far back as the sixteenth century, when the science of mining was taught in the Lyzeum Clausthaliense, a Latin school conducted by monks. By 1864 the institution had become so prominent and its curriculum and method of instruction so thorough that it was deemed advisable to distinguish it from the less pretentious mining schools (Bergschulen) by conferring on it the title Academy for Mining. In 1901 operations were begun on new buildings for the academy. Part of the work is completed, while the rest is being rapidly carried on. The structures will be splendid specimens of modern architecture, and will offer the best of accommodations to the increasing number of students who gather there from all countries.

Courses.—The regular course of the academy covers two years. Lectures begin in October and end in July. The Easter vacation covers four weeks and the Christmas and Pentecost vacations two weeks each. Lectures in this course are all elective. The recommended course of study will be presented later.

Associated with the regular course is a practical preparatory course which offers those who desire to enter the regular course a splendid opportunity to acquire the necessary practical experience in the trade. The course occupies six months, and requires all who take it to begin active work in some branch of the local mines at the early hour of 6 and to continue such work until the noon hour. The afternoons are occupied by lectures which concern themselves with the practical work of the morning or explain and outline the work of the following day.

Equipment.—Not only is the academy most ideally located in the heart of one of the greatest mining regions of Germany, but its equipment is of the finest imaginable for an institution of this kind. Laboratories, collections, museums, and libraries are all modern and comprehensive. The regular school library comprises an admirable collection of 31,000 volumes, while the library of the local government mining bureau, with an equivalent number of volumes, is also at the disposal of the students of the academy. The chemical, physical, and testing laboratories are all equipped so as to meet the requirements of modern scientific experimentation in these fields. The school has a collection of over 700 models, including representations of mining machinery and tools of all varieties, miniature shafts, approaches, pumping plants, motors, etc., all of which are constantly utilized for purposes of illustration in lectures, and are ever on exhibition for those who are interested. A workshop for models is also connected

with the academy, in which many of the models used in the institution have been made by teachers or by students acting under the immediate supervision of teachers. Several large collections of minerals are also to be found. One is a general collection and the other confines itself to the minerals abounding in the Harz Mountains. These collections are generously supplemented by a large geological museum. Another valuable equipment of the academy is found in the collection of ores, in which are included ores from all the important mining centers of the world, together with maps showing the extent of the fields and the general geographical relations of the mines. A unique collection of general and mine surveying instruments has also been gathered, and enables students to obtain a clear idea of the nature of the instruments employed by the most advanced surveyors.

In addition to this splendid equipment by which the student is initiated in concrete fashion into all the more difficult mysteries of his trade, provision is made in the curriculum of the institution for the suspension of lectures during one day in each week, so that this day may be devoted to excursions to neighboring mines and smelting works, which are generally conducted by a member of the staff of instruction of the school. At times excursions are made to more distant mines. These trips, which consume from one to two or even three days, are invariably in charge of some professor of the academy. The value of these excursions in fixing the theoretical instruction of the class room can not be overestimated. This provision for excursions is one of the most commendable characteristics of the German system of industrial schools, and may well be borne in mind by those who are interested in the promotion of efficient trade schools.

Entrance requirements.—It can be readily discerned from the educational requirements for admission that the academy maintains a very high grade of scholarship in its work. The applicant must be a graduate from some German secondary school—that is, from a Gymnasium, Realgymnasium, or Realschule, which are secondary schools with nine-year courses, and are generally completed at the age of 19 or 20. Foreigners must produce proof of an equivalent education. In case the applicant desires to take a course as metallurgist, he must have had at least six months of practical experience in his trade; and if he wishes to study as a miner, twelve months of practical experience are required. In addition to this, no student is admitted who has not completed the eighteenth year, and whose moral character is not good.

Tuition fees.—The tuition fees for the regular four years' course are as follows: for every hour per week of practical work in the laboratories, 4.50 marks (\$1.07); for every hour per week of lectures in the class room, 3 marks (71.4 cents); for every winter semester of laboratory work in quantitative or qualitative analysis, 60 marks (\$14.28); for a summer semester, 45 marks (\$10.71), and for every single month, 18 marks (\$4.28); for work in the testing laboratories, amounting to one day per week, 18 marks (\$4.28) a semester. Glass and porcelain supplies are placed at the disposal of the students free of charge, though a breakage account is kept with every student. All laboratory fees must be paid before the opening of each semester, while other fees are not due until four weeks later.

Curriculum.—The regular course of study, as has been stated, occupies four years. No fixed curriculum has been established for the academy, all lectures being elective, and every student being virtually

free to take up the particular lines of work he desires. However, the authorities of the institution have worked out an elaborate and complete course of study, which is issued in printed form to all applicants, and which is recommended for consultation in the selection of studies. In this recommended curriculum the studies are grouped for instruction in three distinct branches of the industry—mining, general metallurgy, and metallurgy of iron. The following plan of study shows the hours per week for each study and for each semester during the four years' work:

Curriculum at the Clausthal Academy for Mining.

Study.	Hours per week.		
	Mining.	General metallurgy.	Metallurgy of iron.
First year, first semester:			
Higher mathematics	7	7	7
Descriptive geometry	4	4	4
Physics	5	5	5
General chemistry	6	6	6
Paleontology	2		
Machine drawing	2	2	2
First aid to the injured	1	1	1
Total	27	25	25
First year, second semester:			
Higher mathematics	6	6	6
Spherical trigonometry	2		
Physics	5	5	5
General chemistry	5	5	5
Paleontology	2		
Machine drawing	2	2	2
First aid to the injured	1	1	1
Total	28	19	19
Second year, first semester:			
Higher mathematics	2	2	2
Mineralogy	6	6	6
Practical mineralogy	4	4	4
Geology	2	2	2
Blow-pipe analysis	3	3	3
Quantitative testing		2	2
Mechanics	6	6	6
Qualitative chemical analysis (daily practical work).			
Practical physics	2	2	2
Total	25	27	27
Second year, second semester:			
Geology	6		
Practical geology	2		
Blow-pipe analysis	2	2	2
Mechanics	3	3	3
Qualitative chemical analysis (daily laboratory work).			
Thermodynamics	2	2	2
Practical physics	2	2	2
Elements of public law	4	4	4
Total	21	13	13
Third year, first semester:			
Science of mining	8		
Surveying	6		
General metallurgy		3	1
Study of fuels	1	1	1
Testing		6	6
Geography of mineral deposits	1		
Electrotechnics	3	3	3
Qualitative chemical analysis (daily laboratory work).			
Economics	4	4	4
Total	23	17	15
Third year, second semester:			
Dressing and racking of ores	6		
Surveying	4	5	5
Practical mine surveying	4	4	4
Metallurgy		3	

Curriculum at the Clausthal Academy for Mining—Continued.

Study.	Hours per week.		
	Mining.	General metal-lurgy.	Metallurgy of iron.
Third year, second semester—Continued.			
Geography of ore deposits.....	2		
Microscopic mineralogy.....	2	2	2
Quantitative chemical analysis (daily laboratory work).			
Practical testing (1 day per week).			
Electrotechnics.....	3	3	3
Mine administration.....	3	3	3
Total.....	24	20	17
Fourth year, first semester:			
Quantitative chemical analysis (daily laboratory work).			
Constructive engineering.....	12	12	12
Industrial chemistry.....	2	2	2
Geography of ore deposits.....	1		
Metallurgy of iron.....			2
Mining laws.....	4		
Drafting of mining structures.....	2	2	2
Practical metallurgy.....		3	
Total.....	21	19	18
Fourth year, second semester:			
Quantitative analysis.....		4	4
Constructive engineering.....	12	12	12
Metallurgy of iron.....			8
Geography of ore deposits.....	2		
Drafting of mining structures.....	2	2	2
Laboratory practice in metallurgy (daily).			
Study of saline solutions.....	1		
Total.....	17	18	26

Final examination.—The taking of final examinations on the completion of the regular course is optional with the student, though for many reasons it is advisable. Those who take no examinations are merely supplied with certificates of attendance on their withdrawal from the institution; those who take examinations receive diplomas of graduation after having successfully passed an examination which, in all its details, has been prescribed by the State, the latest regulations having been issued by the minister of commerce and industry April 23, 1903. A large number of positions in the Government bureaus for mining and metallurgy are open to graduates who possess diplomas.

Attendance.—The total attendance at the Clausthal Academy of Mining in the year 1902–3 was 232. Of this number, 200 were Germans and 32 foreigners. Among the countries represented were England, by 3 students; Holland, by 3; Russia, by 8; and the United States, by 4. The remaining 14 students came from various countries, all the way from South America to Japan.

Résumé.—The work done in the Clausthal Academy, as well as in all the other German mining schools, is characterized by those winning qualities of system and thoroughness which have made German education famous throughout the world. These professional schools are Germany's most powerful weapons in meeting foreign competition. In them, as in the admirable and numerous engineering schools, is to be found the secret of the recent marvelous development of the Empire's iron industry. From the time the ore is taken from the ground until the completed machine is placed upon the foreign market the iron passes through clever hands, which work with the unerring skill of science and with the close economy of practical training.

II. NAVIGATION, SHIPBUILDING, AND NAVAL ENGINEERING SCHOOLS.

GERMAN SCHOOLS OF NAVIGATION.

Early schools.—The Prussian government turned its attention to the establishment of schools of navigation as early as the beginning of the nineteenth century. One of the first of these schools is reported to have been organized at Danzig in 1817. The purpose of this institution was declared to be the education of competent sailors, pilots, and captains. In the absence of an independent school building, and of sufficient funds to erect one, the new school had to content itself, for the time being, with four rooms of an old church. The course of study occupied two years and was eminently practical. In fact, in all its essentials, the curriculum remains the same to-day.

In the course of the decades following the establishment of the school at Danzig, a number of similar institutions were founded elsewhere. By 1855 such schools had been organized at Memel, Pillau, Grabow, and Stralsund. The attendance at this time was 246, and by 1863 the number had been swelled to 304. More schools were soon added, for their value was proved by the results of the old schools. In close succession there followed schools at Barth in 1865, at Timmel and Leer in 1866, and at Geestemünde in 1870.

Preparatory schools.—It was deemed highly important to provide means whereby the young boy might be started as early as possible in the study of his profession, as it was claimed to be necessary to enter the seaman's profession at a comparatively early age, even at a sacrifice of part of the general education that might otherwise be obtained. For this reason preparatory schools were organized in connection with all the regular schools of navigation, while in some cases special preparatory schools were even established independently. Experience has shown that many of the students who attend the preparatory schools drop out on completing the work without entering the regular schools. Among these are numbered students who are too poor to afford a higher education, as well as those who from the start were undecided as to just what profession they would enter.

Present navigation schools in Prussia.—The popularity and value of the schools of navigation are well shown by their wide distribution throughout Prussia. In 1902 institutions of this class were located at Pillau, Danzig, Grabow, Stralsund, Barth, Altona, Flensburg, Apenrode, Geestemünde, Timmel, Leer, and Papenburg. Each of these schools has a preparatory school connected with it, while similar preparatory schools have been established independently at Swinemünde, Stalpmünde, Zingst, Prerow, Grünendeich, Groh, Emden, and Westrauderfehn.

Attendance.—The total attendance at the preparatory schools, including the independent ones and those associated with regular

schools, was 828 in 1901. During the same year 472 pupils were enrolled at the regular schools, of whom 333 studied as pilots and 39 as captains.

Entrance requirements.—For admission into the schools of navigation the applicant must show familiarity with the German language; knowledge of the fundamentals of fractions, decimals, proportion, extraction of roots; knowledge of algebra and geometry, especially of triangles and circles; knowledge of the elements of political and nautical geography. The possession of these educational requirements is tested by an entrance examination.

Curriculum.—The two years' course of study in schools of navigation includes the following branches: Arithmetic, plane geometry, stereometry, plane trigonometry, spherical trigonometry, mathematical geography, astronomy, drawing; description and use of logs, half-minute glasses, compasses; use of Mercator's charts; calculation of currents in the sea; calculation of time on board; calculation of distances; hydraulics, statics, wind, sails and their manipulation; maneuvering and control of ships; shipbuilding; duties and obligations of captain to his men and his cargo, and in loading, clearing and sailing, quarantine, stranding, salvage, etc. It is hardly necessary to call particular attention to the eminently practical character of this series of studies in preparing a boy for a career on the seas.

No examination is required for admission into the preparatory schools, and the curriculum, with the hours of study per week, is as follows: German, 6; arithmetic, 12; geometry, 8; geography, 4; drawing, 2. This gives a total of 34 hours a week. In addition 2 hours a week are generally devoted to a study of first aid to the injured, under the guidance of a man with a professional medical training.

Schools for inland navigation.—Prussian schools for the instruction of pilots, sailors, and other deck hands employed in inland navigation are found at the following places: Aken, Tangermünde, Parez, Wittenberg, Lauenburg, Schönebeck, Rogätz, Elster, Rosenberg, Mühlberg, Ruhrort, Zehdenick, Bredereiche, Havelberg, Alsleben, Fürstenberg, Wettin, Thorn, Neuendorf, Tschicherzig, Pretzsch, Plaue, Pritzerbe, Fürstenwalde, Polenzig, Lehnin, Coblentz, Linum, and Hameln.

These schools, which were established in the years from 1888 to 1902, were attended by 325 students in 1901. Two-thirds of all expenditures which are not covered by tuition fees are met by the State, and the rest is met by the cities, chambers of commerce, sailors' unions, and other interested organizations. The municipalities, chambers of commerce, and other local bodies also generally furnish rooms, heating, light, and like equipments.

SCHOOLS FOR NAVAL ENGINEERING.

Early schools.—In 1879 the German Emperor by special ordinance prescribed regulations for the holding of examinations for those who desired to enter the profession of naval engineer. While these regulations were not severe, but merely required sufficient knowledge to insure competent service, it was found that the applicants as a body were utterly unqualified for the work. They came largely from the locksmith and fireman trade, and proved poor recruits for the rapidly developing navy and merchant marine of the Empire.

The result was that two schools for naval engineering (See-Dampfschiffmaschinistenschulen) were established—one at Flensburg in 1886 and one at Stettin in 1890. At Flensburg naval machinists from the first to the fourth class were educated and at Stettin only those from the second to the fourth class. The Flensburg school therefore offered the higher grade of instruction.

Curriculum.—The work for machinists of the fourth class, that is, of the lowest rank, involves the following studies: German, arithmetic, mechanical engineering, physics, and technology. A total of 24 hours a week are devoted to these studies for the period of 2 months. Machinists of the third class study German, arithmetic, mechanical engineering, physics, technology, and electrotechnics. The latter branch characterizes the third class. A total of 30 hours a week is devoted to these studies for the period of 2 months. Machinists of the second class study mechanical engineering, drawing, mechanics, physics, technology, electrotechnics, arithmetic, geometry, German, and English. A total of 45 hours a week for the period of 5 months is devoted to these studies. The studies for the first class of machinists are German, English, plane geometry, stereometry, arithmetic, trigonometry, mechanics, physics, chemistry, mechanical engineering, and drawing. Forty-five hours a week are devoted to these branches for the period of 5 months.

While these periods of study for the various courses are apparently very short, much more work is accomplished than the time spent would indicate, for the emphasis placed upon previous practical experience on the part of applicants makes it possible to give a large amount of theoretical instruction in a comparatively short time. In 1901 the school at Flensburg was attended by 47 students and the one at Stettin by 27.

SCHOOLS FOR SHIPBUILDING.

An important department in the technikum, or institute of technology, at Bremen is the school for shipbuilding. This institution, like the school for naval engineering, is a distinct factor in the upbuilding of the German merchant marine. One institution trains the men who build the ships; the other, those who man them.

Entrance requirements.—In contrast with the schools for naval engineering just discussed, the shipbuilding schools impose considerable educational requirements for admission, in addition to practical experience. The applicant must possess a certificate entitling him to the privilege of one year's military service as a volunteer, which means that he must have graduated from a six-year secondary school, or completed at least six years' work at a nine-year secondary school, such as the classical Gymnasium, the semiclassical Realgymnasium or the nonclassical Ober-Realschule. The average age of graduation from the six-year secondary school is between 16 and 18 years. Those who lack such an education may be admitted upon examination, or they may attend a preparatory class with unrestricted admission. In addition to these educational requirements the applicant must have had at least one year of practical experience in the trade. It is a noteworthy fact, and one that can not be too highly commended, that the German industrial schools almost invariably require a certain amount of practical experience for admission to their classes.

Length of courses.—The course in the preparatory school (Vor-klasse) occupies half a year and begins in October of each year. The regular course of the school occupies two years and begins in April.

Tuition fees.—The tuition fee for the regular course is 100 marks (\$23.80) a half-year, or 400 marks (\$95.20) for the two years of work. The fee must be paid in advance at the opening of each semester. Books and other study material are extra.

Curriculum.—The following table permits the reader to see at a glance just how the studies are grouped for the preparatory class and for the regular semester's work.

Curriculum of school for shipbuilding of Bremen technicum.

Studies.	Hours per week.				
	Prepara- tory class.	Lower class.		Upper class.	
		First semester.	Second semester.	Third semester.	Fourth semester.
German	4	2			
Bookkeeping		1	1		
English			2	3	2
Arithmetic	12				
Planimetry	6				
Trigonometry		2			
Stereometry		2			
Review of mathematics		2	2		
Mechanics		5	2	2	
Strength and resistance of materials		3	2	2	1
Graphostatics			2		
Physics		3	3		
Chemistry		2	2		
Descriptive geometry	6	4			
Freehand drawing	4	2			
Shipbuilding drawing		6	8	8	10
Estimates in shipbuilding					1
Laying off ship on mold loft				6	
Mechanical technology			3	3	
Constructive naval engineering			5	8	10
Shipbuilding (theoretical)		4	6	8	9
Electrotechnics					3
Commercial geography and German history	2				
Vertical penmanship	2				
Total number of hours	36	38	38	40	36

That a lad of average attainments will develop into a capable ship-builder after completing a course of study such as the above seems obvious, and the popularity of the Bremen school certainly speaks for the value of the training to be obtained there.

GOVERNMENT AID.

During recent years the German Government has been paying considerable attention to the promotion of schools for navigation, ship-building, and naval engineering, for these institutions are powerful factors in the attainment of her great ideals of commercial supremacy and naval power. The marvelous development of the German merchant marine, as well as of the Empire's naval armament, is a matter of common knowledge. A rapidly increasing number of trained young men are required for the manning of these merchant vessels and warships. So great is the call that the schools can only with difficulty meet it. Applicants for admission to the courses are not infrequently turned away because of lack of accommodations.

In recognition of the growing need for education in this line plans have been made for new schools. At Danzig, for example, a splendid new high school for shipbuilding and related trades is to be opened next year. Courses adapted to the needs of naval engineers, shipbuilders, and navigators are also being given at a number of the technical high schools of the country. It is from these institutions that there are daily going forth the men who will continue the great work of building up the German merchant marine and naval power—a work which is being carried forward with such astonishing rapidity, persistence, and intelligence as to challenge the admiration of the world.

12. SCHOOLS FOR WOOD WORKERS.

EARLY INSTRUCTION.

The first independent school for wood workers was established in Germany about the year 1859. Before that time carpenters, cabinet-makers, and other wood workers had to content themselves with the theoretical instruction offered in the schools for builders already discussed, as well as in the industrial art schools, some of the trade schools, and the largest continuation schools. These schools frequently had special classes for carpenters, cabinetmakers, turners, and other professional wood workers. Some guilds in the wood industry also maintained similar courses. The difficulty with this system of instruction was that too much emphasis was placed upon drawing, and scarcely any on the practical features of the wood worker's trade.

SCHOOL AT BERCHTESGADEN.

Establishment.—The first step to supply this want of practical instruction was taken in 1859, when, through encouragement by the Bavarian government, the first German school for wood workers was established at Berchtesgaden, in the heart of the great forest domains of Bavaria, and in the seat of the leading branches of the wood industry—an industry which had been developing for centuries. This school originated as a branch of the drawing school of Berchtesgaden, which was established in 1840.

Entrance requirements.—The requirements for admission into the school at Berchtesgaden are possession of an elementary knowledge of drawing, completion of the tenth year, and completion of the compulsory education in the common schools, unless excused because of attendance at evening courses. These are minimum requirements, from which it appears that the school is open to practically all students who desire to enter the wood-workers' trade.

Tuition fees.—No tuition fees are charged for residents of the city of Berchtesgaden. Nonresidents pay 20 marks (\$4.76) a semester. This is a very slight charge when the enormous advantages and the good equipment of the school are considered.

Courses.—Four different courses of work are given—a preparatory course, an evening course, a Sunday course, and a graduation course. The efficiency of these courses is greatly increased by the equipment of the school with a good library, large collections of plaster, wood, and other models, drawing charts, graphic productions of art and industry, and ancient wood carvings. Models, drawings, and books may be drawn from the school if security is given for their return.

The work in the preparatory, evening, and Sunday courses is devoted largely to drawing and modeling, so as to develop an idea of symmetry and proportion and to train the eye in accurate work. The regular

graduation course, which occupies two years, lays great emphasis on the practical aspects of the trade, as can be seen from the following curriculum, with the weekly hours of study: Linear drawing, 4; ornamental drawing, 8; wood carving, 30; modeling, 8; total, 50.

During the last year of work only four hours a week each are devoted to ornamental drawing and modeling, and the remaining eight hours are added to the practice in wood working, so as to give thirty-eight hours a week to practical work. It was through its practical work, more than through any other feature of the school, that its success was attained.

Drawing is done in the early stages after plain drawing cards, and develops into the sketching of difficult models of wood and plaster, which the school supplies. In modeling likewise a series of carefully selected and progressively difficult models is followed. During the third and fourth years students are permitted to carve wood for the market and to accept orders from the public. All such work must be done under the supervision of the teachers of the institution. An exposition is held every year from June to September, when not only the best work of the students of the school, but that of graduates as well, is displayed. Articles so exhibited are for sale, and are disposed of through a reliable salesman supplied by the school.

OTHER SCHOOLS IN BAVARIA.

With the school at Berchtesgaden as a successful precedent, there soon developed a number of similar schools, some of which added courses for cabinetmaking and turning in addition to the work in carving. One was established at Bischofsheim, and others at Partenkirchen, Oberammergau, Neuhammer, Kötzing, Fürth, and Furtwangen. The school at Fürth is especially important, and was established to meet the needs of the three great industries which flourish there—cabinetmaking, carving, and turning.

Another important school is located at Furtwangen. It has two departments—one for cabinetmaking, the other for carving—with three classes in each department. Each class continues for the period of one year. The curriculum for the department for cabinetmaking is divided into a practical and a theoretical part. Great emphasis is laid upon practical employment to fix the theoretical instruction given from day to day as the studies progress. The details of the curriculum are as follows:

Curriculum at Furtwangen school for wood workers.

Subject.	Hours per week.					
	Cabinetmaking.			Carving.		
	Class 1, year 1.	Class 2, year 2.	Class 3, year 3.	Year 1.	Year 2.	Year 3.
Practical work.....	43	40	40	43	40	40
Theoretical instruction:						
Drawing.....	6	6	6	6	6	6
German.....	2	2	2	2	2	2
Arithmetic and geometry.....	2	2	2	2	2	2
Calculation of materials and cost.....		1	1		1	1
Penmanship.....	1			1		
Bookkeeping.....		1	1		1	1
Technology of wood working.....		1	1		1	1
Civil government and industrial legislation.....		1	1		1	1
Total.....	54	54	54	54	54	54

OTHER SCHOOLS.

Aside from those schools already enumerated, which lie in Bavaria, there may be mentioned as among the most important the school for turners and wood carvers at Leipzig, the school for wood carvers at Warmbrunn, Silesia, the school for cabinetmaking and wood carving at Flensburg, and the school for carpenters at Berlin. Numerous other schools of this class, of greater or lesser importance, are also found distributed here and there throughout the country as the needs of industry have seemed to call for their establishment.

Related to the schools for wood workers are the schools for basket making, such as are found at Heinsburg, in Prussia, and Lichtenfels, in Bavaria, which two institutions are among the leaders in this class. Schools for straw plaiting are to be found in different sections of the mountainous regions of Germany. The first was established in the Odenwald in 1845. Others soon followed in Saxony and in the Black Forest, where the manufacture of straw hats has been carried on for centuries.

EFFICIENCY OF WOOD WORKERS' SCHOOLS.

It is interesting to note in connection with the work of the woodworkers' schools that the Tyrol, the Black Forest, Odenwald, and Thuringian Forest lands are under very great obligations to them. Oberammergau owes a large part of its artistic powers to the development of its wood workers in schools such as are here outlined. For a long time the Black Forest clock industry was threatened with extirpation. Competition with machine-made clocks was rapidly undermining the Black Forest factories. The schools of Furtwangen and in the Tyrol put it in the power of the Black Forest and Tyrol people to again enter the world's markets and to maintain a position therein. The beauty of the woodwork with which their clocks are now ornamented have made them great favorites in all parts of the world. Without the carved woodwork, it is a question whether the German or Swiss clock industries could continue to exist.

Besides bolstering up the industries of the country the schools add greatly to the people's artistic pleasure and development. Many of the carved objects attain a very high degree of art, and the cabinet-work is as wonderful almost as the creations in painting, bronze, and marble.

There can be no question that these schools for wood workers have been a great blessing. The best proof of their value and their efficiency is found in the fostering attitude manifested by the various governments and the encouragement given by men in the trade. It is interesting to note here that according to the records available to the writer most of the schools were established at times when, through unfavorable tariff conditions or adverse economic developments, the wood-working industry had been thrown into exceptionally straitened circumstances. To relieve the stress resort was had to education. Professional education and training, by creating a deeper understanding of the trade and increasing the skill of the worker, did much to put the industry upon a better footing. Relentless competition, the development of machine carving and cutting, overcrowding in the trade, and numerous other causes have, however, operated to maintain the German wood-working industry at a stage of but half-won prosperity, in spite of a wider dissemination of the blessings of a technical education for its artisans.

13. MISCELLANEOUS TRADE SCHOOLS.

SCHOOL FOR COPPERSMITHS AT HANOVER.

Establishment.—In 1893 there was established at Hanover, through the instrumentality of the German Association of Coppersmiths, a school for the instruction of young men in the copper-working industry. This school was organized as a department of the school for mechanics and industrial arts located in that city.

Entrance requirements.—For admission into the institution the applicant must have successfully completed the common schools (Volksschule), he must have had at least three years of practical experience in the trade, and must possess a good character. If still a minor, he must produce the written permission of his father or his guardian.

Curriculum.—The course of instruction occupies two years, with an average of forty-four hours a week. The various subjects taught, and their distribution through the four semesters of work, is shown by the following summary:

First semester—German, penmanship, free-hand drawing, arithmetic, plane geometry, descriptive geometry, experimental physics, elements of statics, dynamics, elasticity and resistance, geometrical and machine drawing.

Second semester—German, plane geometry, trigonometry, descriptive geometry, technology of the trade, experimental chemistry, mechanics, elasticity and resistance, drawing of apparatus used in the trade, construction of apparatus used in the trade, theory of apparatus used in the trade.

Third semester—machine drawing, apparatus drawing, theory of machines and apparatus employed, mechanics and general engineering, elasticity and resistance, stereometry, arithmetic, technology of the trade, practical chemistry, bookkeeping.

Fourth semester—drawing of apparatus, theory of apparatus, mechanics, graphical statics, arithmetic, geometry, technology of the trade, practical chemistry, estimation of costs and materials in the trade.

Success of the school.—The work accomplished in the school thus far is said to have amply justified and repaid all efforts and expenses of the Association of Coppersmiths. The elementary educational requirements imposed for admission throw the school open to every lad of average attainments who has any inclination to enter the trade. The requirement of three years of practical experience insures the ready assimilation of such theoretical instruction as must necessarily be given in order to bring the standard of work up to the most modern stage of efficiency and to supply the most advanced information in the trade. In addition to this it also operates to exclude from attendance boys who, though they possess the educational requirements, are still

in such tender years that the work loses much of its practical value through their failure to grasp the broader aspects of the trade.

SCHOOL FOR CLOCKMAKING AT FURTWANGEN.

Foundation.—One of the leading German schools offering instruction in the manufacture of clocks and watches is situated in Furtwangen, Baden. It was established in the year 1887, and on the basis of its experience of twenty-six years has developed an organization and framed a curriculum worthy of close attention.

Curriculum.—The course of study occupies three years. Theoretical instruction is given in the morning and practical instruction in the afternoon. The school offers a training for clockmakers, watchmakers, and electrical engineers. The first year of theoretical instruction is the same for all three classes of students. In the second and third years the work is specialized for clockmakers and watchmakers in one group and electrical engineers in another. Practical instruction is necessarily different for each of the three classes of students.

The studies for each year and the number of hours a week devoted to each study are as follows:

First year—arithmetic, 4; geometry, stereometry, and trigonometry, 2; experimental physics, 1; study of materials, 1; geometrical drawing, 5; projection and descriptive geometry, 4; free-hand drawing, 2; German, 2; business correspondence, 2; business forms, 2; total number of hours, 25.

Second year, for all classes—arithmetic, geometry, and stereometry, 3; technology and tool study, 1; experimental physics, 1; mechanics, 3; bookkeeping and exchange, 1. For electrical engineers—electrical engineering, 3; constructive electrical engineering, 6.

Third year, for clock- and watchmakers—construction of clocks and watches, 1; technology and tool study, 1; theoretical explanation of constructive work, 4. For electrical engineers—mechanics, 1; technology, 1; electrical engineering, 3; theoretical explanation of constructive work, 6.

The practical instruction in the several classes is as follows:

First year, for clock makers—practice in working on different materials with files, lathes, and drills; construction of simpler cutting and measuring instruments; construction of simpler parts of clocks. This work consumes 36 hours a week. For watchmakers—practice in use of file, drill, and scarpener; construction of parts of watches in simple method. This work also consumes 36 hours a week. For electrical engineers—practice in working on materials with files, lathes, and drills; practice in hard and soft soldering; making of simple tools, and preparation of materials for work; construction of parts of apparatus employed in electrical engineering and fine mechanics. Thirty-six hours a week are devoted to this work.

Second year, for clock makers—construction of escapement wheels and models; construction of completed clockworks out of raw materials; practice in setting of stones. Thirty-eight hours a week are devoted to this work. For watchmakers—construction of escapement wheels; construction of complete works out of raw materials; practice in the setting of stones. This work occupies 38 hours a week. For electrical engineers—construction of simple electrical apparatus; electrical bells, relays, telephones, microphones, induction coils, etc. Thirty-eight hours a week are devoted to this work.

Third year, for clock makers—construction of complete clocks, with pendulums and striking works; construction of astronomical regulators; construction of clocks for special purposes, of clocks for registration, and of chronoscopes, electrical hand systems, and electrical clocks. Fifty hours a week are devoted to this work. For watchmakers—construction of complicated watches; repair of simple and complicated watches. Fifty hours a week are devoted to this work. For electrical engineers—construction of electrical and magnetic measuring instruments, chronographs, Morse apparatus, arc lamps, dynamos, and electrical motors. This work consumes 47 hours a week.

Tuition fee.—The tuition fee is 25 marks (\$5.95) a year, payable semiannually. Practically all tools and raw materials are supplied by the school. As a result all clocks, watches, and other apparatus constructed in the school are the property of the institution, and may be sold on its account. As the students in the second and third year of work turn out products of excellent quality the school has been able to obtain a small income from this source.

TANNING SCHOOL OF FREIBERG.

Standing.—The tanning school at Freiberg, Saxony, is one of the leading institutions of its kind in the world. Established in 1889, it has experienced unusual progress. The thoroughness of its courses and the competence of its teachers have won for it a high place in the estimation of all tanning interests of Germany. It annually receives donations from tanning firms, trade papers, and private individuals in recognition of its work. In addition to this it receives an annual subsidy of 5,000 marks (\$1,190) from the Saxon ministry of the interior, as well as 2,400 marks (\$571.20) from the city of Freiberg. The cosmopolitan character of the students is a good proof of the international reputation of the school. Forty-two of the 76 students who attended the tanning school during the year 1902–1903 were foreigners, coming from Austria, Roumania, France, Holland, Belgium, Italy, Sweden, Russia, Chile, and Japan.

Administration.—The tanning school is under the general supervision of the Saxon minister of the interior. Its direct administration is vested in a board of directors (Vorstand). This body is composed of the following members: One member of the city council of Freiberg, three members of the tanners' guild of Leipzig, three members of the Saxon Union of Leather Producers, one member of the southern and western branch of the German Leather Manufacturers, one member of the board of directors of the Central Association of the German Leather Industry, and the director of the school.

We have before us an instructive lesson in the organization of industrial schools. Germany has with great wisdom and foresight almost invariably applied the principle of the representation of interested industries in determining the composition of boards of directors and supervisors of her industrial schools. The school thus placed under the control of Germany's leading men in the tanning and leather industry is in an admirable manner brought into the most intimate relation possible with the trade for the advancement of which it is maintained. The institution is bound to be progressive. Its curriculum is constantly remodeled to keep pace with the development of the

leather industry. No board of directors could possibly be better qualified than this one to adjust the educational work of the institution to the most advanced needs of the trade.

Entrance requirements.—Every applicant must have completed his seventeenth year. No theoretical knowledge is required or tested by examination. A good common school education is, of course, assumed, as this is absolutely essential for the understanding of lectures and other instruction given in the various courses. Emphasis is, however, placed upon a good foundation of practical knowledge of the trade based upon actual experience. A limited number of those who lack such practical knowledge may be taken into the tannery connected with the school. The fee for work in such cases is 200 marks (\$47.60) for Germans and 400 marks (\$95.20) for foreigners. Discrimination against foreigners is quite common in German industrial schools, and finds complete justification in the defense of national interests. The regular tuition fees are also 200 marks (\$47.60) for Germans, and 400 marks (\$95.20) for foreigners. In addition to this, 25 marks (\$5.95) are exacted for the use of the splendid laboratories connected with the institution. The tuition fees and other expenses just mentioned cover the entire course of one year.

Curriculum.—The following statement gives a synopsis of the curriculum of the school and the number of hours a week devoted to each branch: Scientific lectures on dyeing, 3; preparatory processes to dyeing (practical), 10; general chemistry, 6; applied chemistry, 6; different systems and methods of tanning, 2; leather dyeing, 2; physics, 2; microscopic demonstrations, 2; engineering and building, 2; drawing, 2; bookkeeping, 3; commerce and exchange, 2; economics, 1; commercial arithmetic, 2; German language, 2; first aid to injured, 1; total hours, 48.

Instruction in all of these branches is given with special reference to the needs of the tanning industry. The number of hours devoted to lectures on physics, leather dyeing, and tanning systems, and to microscopic demonstrations varies between one hour a week in one semester and two hours in the next. The entire course, as stated before, occupies one year. The excellence of the Freiberg school depends not so much on the presence in the curriculum of certain subjects of instruction as on the high efficiency of its instructional force and the wisdom of its management by a board of directors eminently qualified to understand and meet the most advanced needs of the trade.

OTHER TRADE SCHOOLS.

Space does not permit further discussion of special trade schools. So comprehensive is the subject, and so numerous are the institutions, that volumes might easily be compiled in the presentation of a complete and thorough picture of the special trade schools of the German Empire. Many important trade schools have not been mentioned at all. Not even all the larger classes of institutions have received attention. There remain unnoticed also countless minor schools, designed for instruction in some trade, all adding a salutary influence on the industrial welfare of the country. Most of the minor trade schools are maintained by guilds and trade associations, though some are supported by private enterprise. Among these institutions are found schools for tin workers, brewers, barbers, bookbinders,

printers, decorators, druggists, dyers, butchers, gardeners, hotel keepers, waiters, plumbers, bakers, millers, locksmiths, blacksmiths, chimney sweeps, shoemakers, toy makers; in fact, schools for practically each and every trade (Handwerk) known to the German industrial world.

While each of these schools is comparatively unimportant, their collective influence is incalculable. Every boy learns his profession theoretically and practically before being permitted to engage in it. The guilds require attendance at their schools as a preparation for their Beruf, or calling, and a paternal and watchful Government stands vigilant guard to prevent the ignorant pursuit of a profession by requiring proof of ability and previous training. Every calling, from the lowest to the highest, is thus permeated by the salutary influence of professional education. Since competitors have all drunk at much the same springs, and are protected by much the same educational armor, the struggle in the trades is close, and an existence is not won but rather wrung from opponents. While, in view of the peculiar political, social, and industrial characteristics of the country, a certain freedom of development is lost to the German artisans, they do not present that wide divergence of the competent and the incompetent which characterizes the American artisan. Every system has its faults, and whatever the fault of the German system of trade education, it certainly possesses the telling advantage of producing a generally efficient and very uniformly capable body of artisans in all the trades.

14. INDUSTRIAL SCHOOLS FOR WOMEN.

EARLY SCHOOLS.

Educational institutions for the instruction of girls in industrial pursuits are of comparatively recent origin in Germany. These institutions did not develop until within the last half century, but more than a century before this there existed schools for the instruction of girls in reading, writing, and hand work, such as spinning, darning, knitting, sewing, and mending. These primitive schools possessed the character of home institutions and home schools rather than of public industrial schools, though they were even in the earliest stages of development called Industrieschulen, or Erwerbschulen. They were maintained primarily for poor girls whose future had little of promise. They were attended by girls between the ages of 6 and 14. In 1865 the nine schools of this class which then existed in Berlin were attended by 720 girls, three-fourths of whom were the daughters of small artisans, merchants, hand and factory laborers, and servants.

DEVELOPMENT OF MODERN SCHOOLS.

It was from 1850 on that the real industrial continuation and special trade schools for girls, as we know them to-day, developed. The reasons for their rapid evolution in the modern era were partly social and and partly economic. The development of industry opened up numerous forms of labor which could be satisfactorily done by the hands of women. It is also stated that the number of unmarried women belonging to the better classes increased, and that opportunities for their employment in some independent position were called for. The professions of teaching in public schools and in families were overcrowded. One solution of the difficulty was the study of some industrial pursuit. To meet the demand there developed, in the early days of 1860, private commercial schools for girls at Stuttgart, Munich, Leipzig, Berlin, and elsewhere. Organizations arose for maintaining a more effective and systematic propaganda in favor of new industrial schools for girls. Most important and prominent in this work was the Central Association of Prussia for the Welfare of the Laboring Classes (Zentralverein in Preussen für das Wohl der arbeitenden Klassen), which in 1865, through its famous president, Dr. Adolph Lette, published a memorial on the necessity for the establishment of better industrial schools for girls. This memorial led to the founding of the well-known Lette-Verein.

THE LETTE-VEREIN AND ITS SCHOOLS.

Aims.—This organization to-day stands at the head of the movement for the promotion of higher education among women and the development of their industrial abilities. Its aims and activities may be briefly summarized under six main heads: (1) The removal of all obstacles

and prejudices against the employment of women in an industrial capacity; (2) the promotion of educational institutions for the instruction of women in industrial and commercial pursuits; (3) the rendition of aid to women in search of proper employment; (4) the establishment of bazaars for the exhibition and sale of hand and art work of women; (5) the protection of girls against exposure to questionable moral conditions and influences through the recommendation of places for lodging and board; and (6) the establishment of savings funds and loan funds.

In connection with the Lette-Verein the following industrial schools have been established: A commercial school, a course for clerical assistants, an industrial school giving opportunities for the study of different trades adapted to women, and a special school of photography.

Commercial school.—The curriculum of this school is divided into two classes, each of which continues for the period of one year. The first year's work is preparatory and open to all. For entrance into the second year's work an examination must be taken covering the following subjects: German composition, French and English translations, grammar, and arithmetic. Applicants for the examination must be at least 16 years of age, and must be graduates from some higher school for girls (*höhere Mädchenschule*), or from an institution possessing a like educational rank (about the same as graduation from a grammar school).

The curriculum and the hours of study a week are as follows:

Preparatory course (first year)—commercial arithmetic, 3; commercial correspondence, 2; French and English grammar, 9; German language, 6; geography, 2; total hours a week, 22.

Second year—commercial writing and stenography, 4; typewriting, 2; commercial arithmetic, 2; office work and correspondence, 2; book-keeping, 4; French and English conversation, 6; German, 4; geography, 2; total hours a week, 26.

The tuition fees for this course are 160 marks (\$38.08) for the first year and 200 marks (\$47.60) for the second year.

Clerical course.—This course is designed for the instruction of girls who contemplate taking positions as assistants in business offices, with lawyers, notaries public, trade organizations, government bureaus, etc. The curriculum and hours of study a week are as follows: Arithmetic, 2; law and office duties, 5; stenography, 6; typewriting, 4; German business correspondence, 2; penmanship, 1; total number of hours, 20.

This course continues for six months, and costs 150 marks (\$35.70). The attainment of the eighteenth year and a good preparatory education are requisites for admission.

Trade school.—Instruction in the different branches of the trade school is systematic and thorough, and has won a preferential position for the graduates of the school. The following are the leading trades taught: Fine hand work, machine sewing, tailoring, linen sewing, millinery, hair dressing, washing, ironing, cooking, nursing, serving, vegetable cooking, domestic economy, art embroidery, art embroidery on sewing machines, ornamental drawing. Each trade follows its own line of work. The average length of the courses is about three or four months. Some continue six months or a year. The tuition fees range from 6 to 12 marks (\$1.43 to \$2.86) a month. In the cooking

school a higher fee is necessary, students paying 100 marks (\$23.80) for the three months. A longer course may be taken if desired.

Rules of conduct.—The girls who attend these various schools of the Lette-Verein are in good hands. A strict surveillance is kept over their doings. All are required to obey the daily rules of conduct from the ring of the first bell at 6.30 in the morning until the lights are turned out at 10.30 in the evening. Moreover, every opportunity is given for the development of their physical and spiritual side.

OTHER ASSOCIATIONS MAINTAINING SCHOOLS FOR GIRLS.

Although some good schools have been established through private enterprise and are carrying forward a good work, many of these institutions are reported to have but partly fulfilled their great mission, through a lack of equipment and incompetent or inadequate teachers. Most effective and most far-reaching has been the work of the organizations of women. Though the Lette-Verein may be the leader in the movement, another organization which deserves special mention here for its noble work in behalf of the laboring women of Germany is the General Association of German Women, founded in Leipzig in 1863. The methods pursued by this association resemble closely those of the Lette-Verein. With these two organizations as shining examples and aided by the general approbation of the public, there soon originated a large number of other associations of women of local importance, all adding their benevolent influence for the accomplishment of a good work. Among these are the Alice-Verein, Darmstadt; the women's industrial associations, Bremen, Hamburg, Breslau, Reutlingen, Karlsruhe, Dresden, Stuttgart, Braunschweig, Kassel, Hanover, Frankfurt, and Königsberg, and, in short, "vereins" of one kind or another in most of the larger German cities.

SAXON INDUSTRIAL SCHOOLS FOR GIRLS.

Employment of women in Saxony.—Saxony, the greatest seat of German industry, employs the largest percentage of women in proportion to the total population. They work side by side with the men in the great textile factories, making gloves, stockings, underwear, lace, and trimmings, finishing, sewing, weaving, dyeing, and doing a thousand other things. In other industries also they are present in large numbers.

Character and location of schools.—In 1899 Saxony had 24 special trade schools, as well as 14 general industrial schools, for girls. Among the special trade schools were 30 schools for hand lace making (Klöppeleischulen), 3 for straw plaiting (Strohpflechteschulen), 3 commercial schools (Handelsschulen für Mädchen), as departments of the commercial schools of Mainichen, Grossenhain, and Plauen, an industrial drawing school at Schneeberg, a department for girls at the industrial school of Plauen, and 4 schools for tailoresses.

Establishment.—Of the 14 general industrial schools for girls, 8 were established by private individuals, 5 by associations of women such as the Frauen-Erwerbsverein and Frauen-Bildungsverein at Dresden and the Frauen-Gewerbeverein at Leipzig, and one by the State, namely, the school for hand lace making (Spitzenklöppeleimusterschule) at Schneeberg.

Length of courses.—The courses of instruction at these institutions vary in length, according to the difficulty, and number of the branches taught, from a few months to one, two, or three years.

Teachers.—The total number of teachers engaged in the 14 general industrial schools in 1899 was 143, of whom 106 were women and 37 men. The subjects taught included all forms of hand work peculiar to women, bookkeeping, music, industrial art work, general commercial subjects, and domestic science.

Attendance.—The total number of girls in attendance in 1899 was 1,800, of whom 180 were non-Saxons. Three schools had an enrollment of 265, 339, and 383, respectively.

Tuition fees.—The tuition fees vary from 50 pfennige (11.9 cents) a month, to 450 marks (\$107.10) a year, according to the character and importance of the work.

Income and expenditure.—The total expenditures of 11 of the general industrial schools for girls (no statistics for the rest were available) were 142,000 marks (\$33,796), of which 65,225 marks (\$15,523.55) represent the salaries of teachers. The incomes of these schools came from the following sources: Tuition fees and entrance fees, 86,790 marks (\$20,656.02); donations of interested parties, 4,200 marks (\$999.60); subsidies from cities, 3,965 marks (\$943.67); from the kingdom of Saxony, 12,700 marks (\$3,022.60). The 14 schools receiving the benefit of these aids are located as follows: 5 in Dresden; 3 in Leipzig; 3 in Chemnitz; and 1 each in Schneeberg, Schwarzenberg, and Schweikershain.

GERMAN SCHOOLS FOR DOMESTIC SCIENCE.

Quite different in character from the industrial schools proper (Erwerbschulen or Gewerbeschulen für Mädchen) are the schools for domestic science (Haushaltungsschulen), in which young women are taught the duties of the home and acquire the accomplishments of the cuisine. The development of these schools began after 1850, and took a special impetus during the last few decades as a result of the tremendous evolution of industry and the rapidly increasing number of girls participating in hand and factory labor.

These young women entered the workshops and factories in growing numbers immediately upon completion of their compulsory education in the common schools. They passed from the girlhood days of the home and school directly to the toil and hardship of industrial labor. They left untutored in home duties, and ignorant of those household and kitchen arts which ought to grace a successful wife. The result frequently was unhappiness in marriage and dissatisfaction in the home. While the path of civilization may not lie wholly through the stomach, it is undoubtedly considerably widened through the agency of a good digestion. The need for some opportunity whereby these girls might be instructed in household arts was palpable. Advocates of schools for domestic science, like Freiherr von Diergardt (main work from 1849 to 1851), were heard on all sides. One after another, schools for domestic science were established in the empire, where, during the hours of evening, girls might gather the elements of cooking, and be aroused to a fuller appreciation of the duties and responsibilities of the home, from the benign influence of which the toil for daily bread has so early robbed them.

Soon after the establishment of the first schools of domestic science for poor laboring girls another and exclusive set of institutions of similar name developed for the benefit of girls coming from the higher classes of society. In principle and aim both schools were alike. None but class distinctions separated them. Obviously the reasons for these schools were different. The schools for poor girls arose because industry called the poor girl away from home life and home work. The schools for the better class of girls arose because these were frequently unable to acquire in the home, because of the incompetence or lack of time or inclination to teach of the mother of social rank, that familiarity with cooking and other domestic duties which it was deemed desirable for them to possess. The result was that special courses for these girls of higher social rank (mainly the middle classes) were organized in connection with the higher industrial schools for girls, or entirely independent schools were established.

RECENT GROWTH OF SCHOOLS FOR GIRLS.

The value and effectiveness of these institutions in the promotion of the industrial welfare of German women and the improvement of the home were soon generally recognized. Schools sprang up everywhere. The enterprise was too large for private undertaking alone. Soon the State, provinces, circles, cities, and commercial and industrial organizations came to the rescue. Subsidies were gradually increased as the work of the schools vindicated the outlay. Commercial schools, schools for industrial art, industrial continuation schools, and textile schools, which heretofore had been open to boys alone, were thrown open to girls as well. Frequently special departments or courses were organized.

A special impetus was given through the establishment of two large schools for girls at Posen and Rhydt by the Prussian government. In these institutions provision was made for commercial courses, trade courses, and courses in domestic science. They were to serve as models for others to be established through private enterprise or local public initiative. Good teachers were engaged, and no pains were spared to raise the schools to the highest grade of efficiency. This recognition by the State of the necessity of these schools was a powerful factor in their further development. With marvelous rapidity these institutions for the weal of the German woman in home and industry multiplied in recent years, until to-day there is not a city of importance in the Empire without one or more of these schools.

LOCATION OF LEADING SCHOOLS FOR GIRLS.

According to statistics of June 1, 1901, the latest available to the writer, Prussia had 603 public and private institutions in which instruction in domestic science or in some trade was offered to girls. The total attendance at these schools in 1901 was 24,313. Among the leading schools in Prussia are the two Government schools for girls at Posen and Rhydt; the seven Government embroidery schools in Silesia; the city industrial and trade schools for girls at Berlin, Charlottenburg, Gnesen, Görlitz, Halle, Bielefeld, Hildesheim, and Falkenburg; the larger association schools at Berlin (Lette-Verein, Viktoria, Fortbildungsschule, Heimathaus, all for girls of a higher rank); the association

schools at Breslau, Cassel, Kiel, Königsberg, Frankfort, Cologne, Hanover, Magdeburg. The chambers of commerce at Crefeld and Düsseldorf maintain commercial schools for girls. The great textile schools of Crefeld, Barmen, Berlin, Sorau, Langenbielau provide courses for girls. The textile schools of Aix la Chapelle, Cottbus, Forst, and Luckenwalde have special courses in darning.

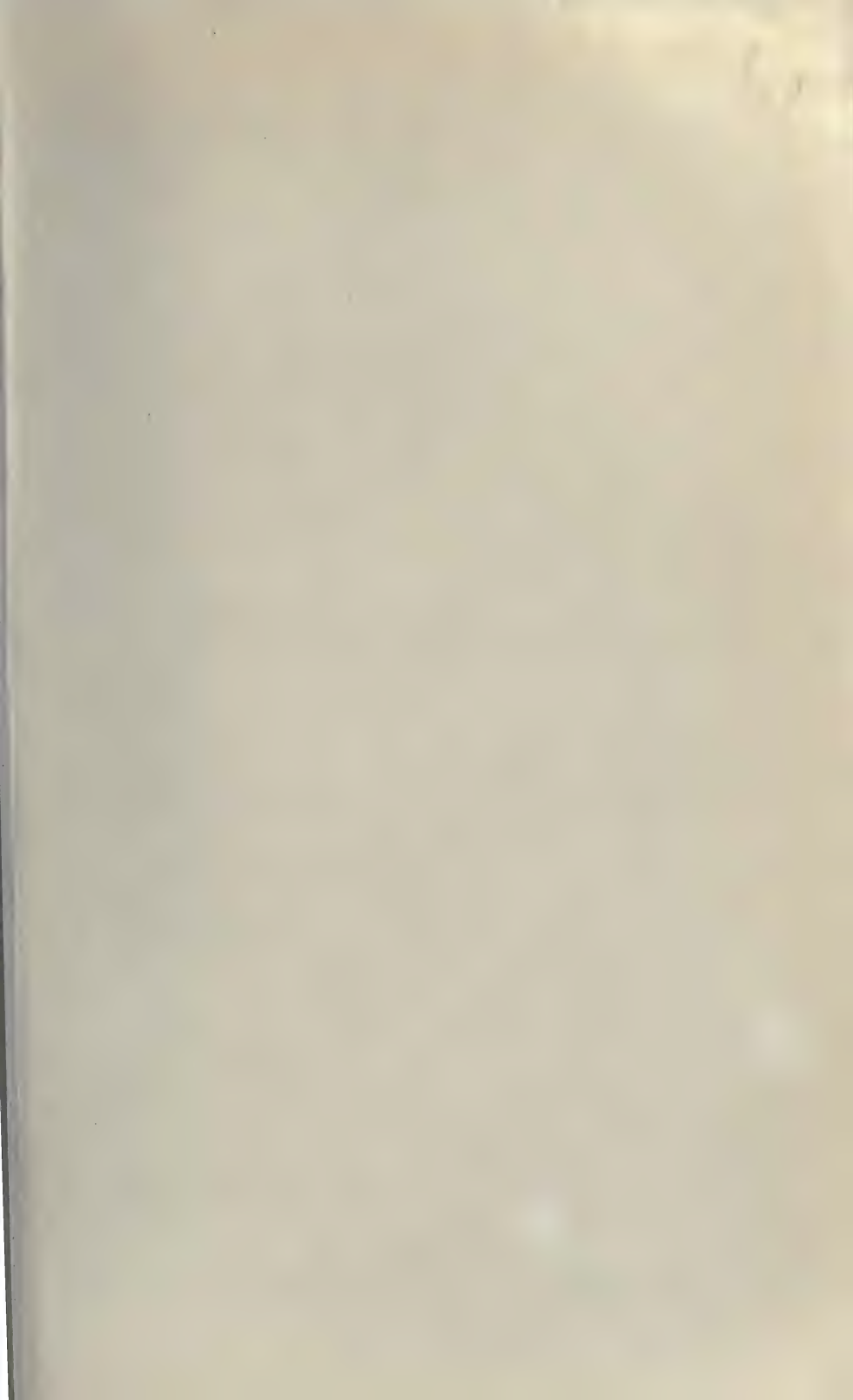
In 1900 Bavaria had 39 industrial schools for girls, with 3,462 students, and 5 seminaries for the education of female teachers at industrial schools for girls, with 73 in attendance.

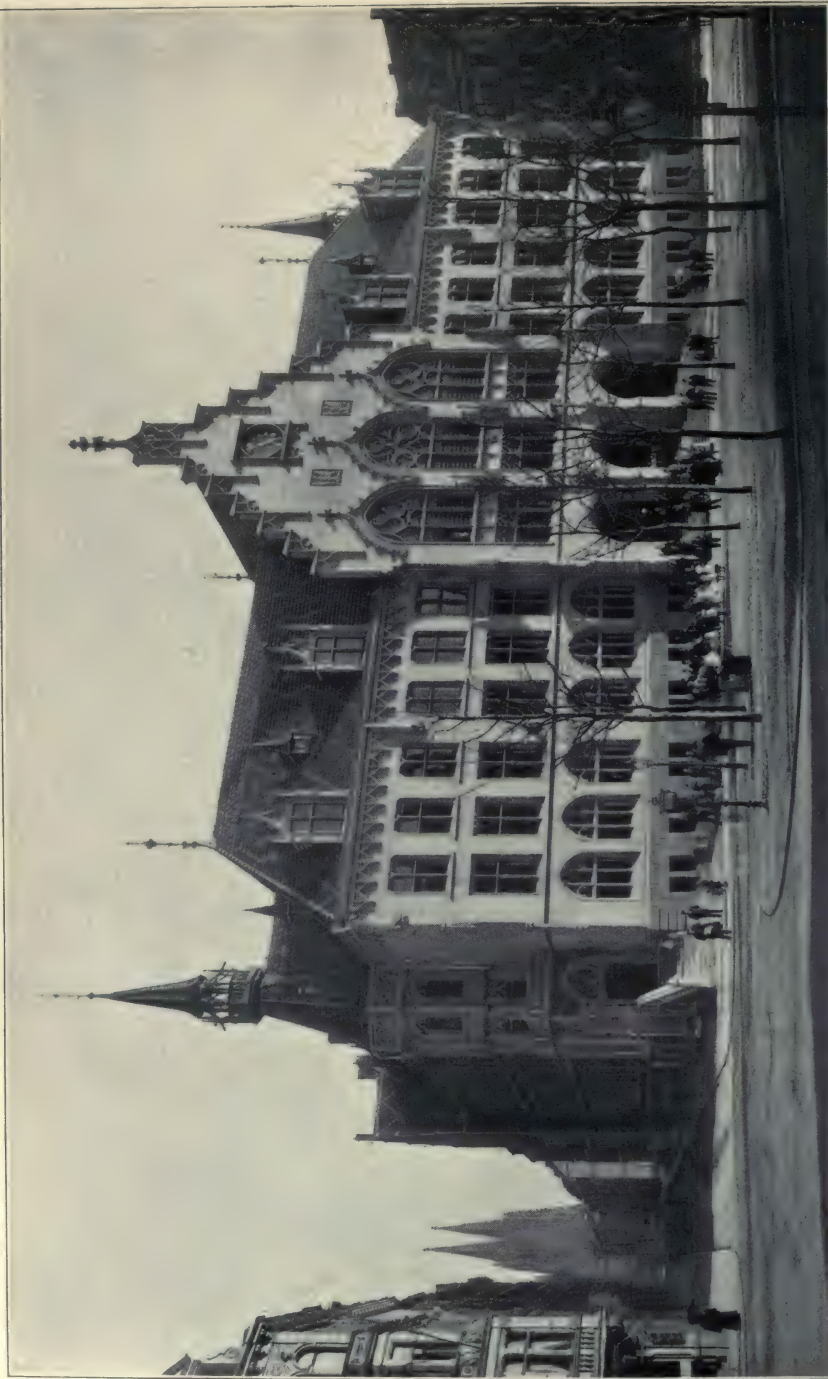
In 1899 Saxony had, as has been stated, 24 special trade schools for girls and 14 general industrial schools, the latter alone having an attendance of 1,800 students.

In 1901 Württemberg had 16 industrial continuation schools for girls, with 971 students, and 26 schools for domestic science, with 5,422 students.

In 1902 Baden had 36 schools for domestic science.

Other members of the Empire have been quite as solicitous for the welfare of the working classes among women as the States already mentioned, so that Germany can probably boast to-day of the best system of industrial schools for girls that the world knows.





COMMERCIAL HIGH SCHOOL, COLOGNE, GERMANY.

15. COMMERCIAL SCHOOLS.

DEVELOPMENT.

The commercial schools (*Handelsschulen*) of Germany are of very recent development. Their history dates back hardly two decades in the last century. Before 1880 they were almost unknown, even in their elementary form. Their development was most rapid after 1890, and it was as late as 1898 before the first commercial high school (*Handelshochschule*) was established. To-day no branch of industrial education is more popular or more highly appreciated by the country. The commercial schools developed slowly and with difficulty during the early stages, because of the reluctance of the State to give them financial support. The various governments of the Empire yielded but tardily to the movement. The main reasons for this must be sought in the fact that the German States were at the time busily occupied with the organization of the modern nonclassical "real" schools (*Realschulen*), which were specially designed for the offering of a thorough general education that might serve as a broad foundation for a business career. The commercial schools were looked upon as superfluous, or as specializing too early or too highly. Slowly, though cautiously, the various governments contributed to some of the leading commercial schools which had been established by chambers of commerce, trade organizations, or private individuals, and awaited the results of their experimental investments. The schools soon won wide popularity, and, the original prejudices having been overcome, the States entered freely into the work, encouraging and aiding where necessary or expedient. To-day every government of the Empire contributes annually to the funds set aside for the administration of commercial schools.

IMPORTANCE.

The value of these commercial institutions in the industrial evolution of the Empire can hardly be overestimated. They have contributed very greatly to the phenomenal development of German commerce and to the present commercial greatness of the Empire. While the special trade schools, already discussed, and the numerous other industrial schools of the country have all accomplished much toward the upbuilding of German industry, it remained for the great commercial schools to educate men "whose ships sailed on many seas," and who had learned how to introduce the products of German industry into the most distant markets of the globe. The trade schools teach the artisan how to apply science and skill in his handicraft, and how to produce a useful and clever product; the commercial schools educate the merchant, the wholesaler, the world dealer, the great banker, the organizer of the industrial museum, the secretary of the chamber of commerce, the consular officer, the president of the trade

organization—in short, the men who stand at the helm in the commercial world. The trade schools educate the maker of a good product, the commercial schools educate the man who makes that product famous in the markets of the world. Both systems of education are necessary for the promotion of industry and the defeat of foreign competitors. The place of neither can be taken by practice alone, for the field to be covered has grown too large. Some of the great German industrial educators recognized this fact decades ago, and to-day the Empire is reaping the results of their efforts.

In Germany emphasis was originally placed on the establishment of trade schools to the neglect of commercial schools. The value and expediency of the latter institutions were questioned. The merchant, it was claimed, must learn his profession by actual practice, not out of books. In those days, because of the limited field of activity, he who learned by practice succeeded. No world-wide knowledge of commercial conditions, in their manifold forms and complex relations, was necessary. Formerly the world of the merchant was largely that of his locality or province or, at most, of his country. To-day it embraces the entire globe.

DEFINITION.

A common error among writers on industrial education is to use the terms "industrial education" and "commercial education" indiscriminately. They speak of "industrial schools" and "commercial schools" as the same class of institutions. As a matter of fact, however, the term "industry" really comprehends three great classes of activity—agriculture, manufacturing, and commerce—or the production of raw materials, the working of these materials into useful articles or commodities, and the sale of these commodities on the markets of the world. An "industrial school" is, hence, any institution which offers instruction in one or more of these three branches of industrial activity. It may be a school of agriculture, a school of engineering, or a school of commerce. On the other hand, it would hardly do to call a school of agriculture a commercial school.

SCOPE.

From what has already been said it is plain that commercial schools are designed for the education of men who contemplate the adoption of mercantile pursuits in one capacity or another. Commercial activities being frequently world embracing and commercial knowledge being applicable in many walks of life, the task of the commercial schools is a big one. It involves the education of men whose careers require a widely differing intellectual attainment and commercial knowledge. Commercial undertakings ranging from unimportant local operations requiring but an elementary understanding of the trade to world-wide operations requiring an accurate and comprehensive knowledge of the universal market set the bounds of commercial education wide indeed. If, hence, a system of commercial schools is to fulfill its mission successfully it must offer opportunities for the education of the lowest clerk in the mercantile house and the world trader who operates on a colossal scale. Germany, in the estimation of the writer, can boast to-day of the nearest approach to such a system of education.

Just what to offer to meet these widely diverging needs, how to offer it, or whether to offer it at all have been mooted questions among German promoters of commercial education and their opponents. The clash of ideas has been incessant since first the problem appeared, and even to-day frequently almost obscures the issue by din and smoke. When a boy ought to enter a commercial school, how long he ought to stay there, what he ought to study, what practical experience (if any) he ought to possess, what grades of schools ought to be established—all these vital questions have been taken up again and again in that systematic, thorough, and admirable manner for which the German educator is celebrated. Today, in the light of experience, the smoke is slowly clearing away and is unveiling to the eyes of the world a system of commercial education of which the nation may well be proud.

CLASSIFICATION.

Two great classes of commercial schools may be distinguished in Germany—the ordinary commercial schools (*Handelsschulen*), and the commercial high schools (*Handelshochschulen*). The class of *Handelsschulen* can again be divided into two departments—the lower commercial schools (*niedere Handelsschulen*, or simply *Handelsschulen*), and the higher commercial schools (*höhere Handelsschulen*). The latter class must not be confused with the commercial high schools, which in the general system of education rank with the higher institutions of learning, such as the technical high schools, agricultural high schools, and universities. The commercial high school requires for admission graduation from a secondary school, such as a *Gymnasium*, *Realgymnasium*, or *Ober-realschule*, which are secondary schools with nine-year courses, or graduation from a secondary six-year school with a certain amount of practical experience, or an equivalent education proved by examination or certificate. The *höhere Handelsschule* is merely an advanced course, following the *Handelsschule*. In general, it may be said that the graduate of a *höhere Handelsschule* can gain admission to a *Handelshochschule*. In other words, the former ranks as a secondary institution, while the latter is a higher institution.

AIMS.

It is difficult to present an accurate definition of the aims of a *Handelsschule* because of the great disparity in rank and organization which prevails among institutions included under this expression. Some promoters of *Handelsschulen* believe that they ought to offer a final education to young men who contemplate entrance upon some commercial pursuit. Commercial high schools (*Handelshochschulen*) are held to be superfluous, even injurious, on the ground that they occupy too many years of the boy's life. With men entertaining such views the *Handelsschule* is the all in all, and ought to aim at the preparation of men for every rank in commercial activity from that of the office clerk to that of the universal merchant, the latter to receive but an elementary foundation for his broad work, the rest to be acquired in actual practice. However, during the last few years sentiment has been rapidly strengthening in the support of special advanced commercial high schools (essentially commercial universities, analogous to the schools of commerce established in a number of leading American universi-

ties), which will be the subject of a later discussion. With four such schools already prospering in the Empire, the aims of the lower commercial schools have been reduced within less pretentious bounds. Young men who aim at higher positions in commercial life are turning in growing numbers to these commercial high schools, thus compelling the lower commercial schools to adjust their curriculums and their organization to the needs of the smaller merchants, clerks, bankers, and manufacturers.

COMMERCIAL CONTINUATION SCHOOLS.

The most elementary form of commercial education is offered in the commercial continuation schools (*kaufmännische Fortbildungsschulen*), which in the German educational system rank with the general continuation schools (*allgemeine Fortbildungsschulen*, nonindustrial schools) and the industrial continuation schools (*gewerbliche Fortbildungsschulen*), which follow directly after the common schools. Reference has been made to these schools in an earlier chapter on general industrial continuation schools.

No special entrance requirements are imposed by most of these schools, though a certain period of practical experience in some business is necessary for entrance into some of them. Boys may enter the schools on completion of the public schools (*Volksschule*), and in some instances they may do so even before finishing their common school education. Compulsory attendance is not uniformly in force, though it is the rule rather than the exception. By this is meant that under the laws of most German States children must attend either the general continuation schools, the industrial continuation schools, or some equivalent after graduation from the common schools, until a certain age, generally 14 years.

Sessions of the commercial continuation schools most frequently fall in the evenings, from 8 to 10 o'clock. Sometimes early morning hours, from 6 to 7 or 8, are also chosen, as well as Sunday mornings, before church hours, from 7 to 9, or Sunday afternoons.

Most of these schools are promoted by chambers of commerce, commercial organizations, and private individuals; some are aided by State subsidies. In Baden the State is very active. The cities very generally furnish the school buildings—or rather, supply rooms for meetings, as well as heat and light, by placing at the disposal of the directors of the commercial continuation schools some of their common or “real” school buildings or other public buildings. The tuition fees vary widely, from perhaps 20 marks (\$4.76) to 100 marks (\$23.80) and more a year. Strict discipline is maintained, as in all continuation schools.

Elementary instruction is given in commercial arithmetic, commercial geography, commercial law, commercial correspondence, bookkeeping, modern languages, penmanship, shorthand, typewriting, transportation, history, etc. Not all of these branches are taught at every commercial continuation school. Just what studies are taken up depends on the importance, the financial support, and the aims of the institution. Studies are in some cases optional, while in others there are prescribed curriculums. Great diversity prevails in the organization of these schools; yet they are carrying forward a wonderful work, elementary though the instruction be, and are fitting large numbers of

German youths for successful commercial pursuits. They are now found in cities of all sizes in all parts of the Empire, and frequently have a very large enrollment.

In 1902 Prussia had 244 commercial continuation schools, 146 with compulsory and 98 with optional attendance, with a total enrollment of 23,037 students. In the same year Bavaria had 20 such schools, 10 of which were independent and 10 associated with "real" schools. Saxony had 47 schools, with a total attendance of 4,744 students. Baden had 23 schools, with 2,600 students, of whom 200 were girls.

COMMERCIAL SCHOOLS OF SAXONY.

Origin and nature.—The commercial schools of Saxony are chosen for purposes of illustration because of their typical character and their location in the heart of industrial Germany. In 1899 Saxony had 48 commercial schools, of which 6 were founded since 1894. Of these schools, 39 were established by associations, 4 by cities, 5 by private individuals, and 1 by the chamber of commerce of Leipzig. Thirty-seven offer instruction solely for apprentices, 1 confines its work to the book trade, 4 have higher departments (*höhere Handelsschulen*), and 5 have provided for a one-year course. Three also have special courses for girls (*Mädchen-Abteilungen*), namely, the schools at Grossenhain, Hainichen, and Plauen.

Entrance requirements.—For entrance into any of these schools the applicant must have attained the age of 14 years and have completed the work of the common schools. Graduates from the four higher commercial schools are given the privilege of one year's military service as volunteers (*einjährig-freiwilligen Militärdienst*) instead of three years' regular service. The work of these schools is hence considered equivalent to that of the Progymnasium, Real-Progymnasium, or Realschule, all of which are secondary schools with six-years courses, whose graduates are entitled to a similar military privilege. All students at commercial schools are relieved from attendance at general continuation schools.

Courses.—The courses of the higher commercial schools invariably occupy three years. The apprentices' schools (*Handelsschulen*, *Handelslehrlingsschulen*, or *Handlungsschulen*) also generally have three-year courses. The course in the department for girls at Hainichen occupies two years, and those at Grossenhain and Plauen one year.

Teachers and attendance.—The 48 commercial schools of Saxony employed, in 1899, 344 teachers. Of these 120 devoted their time solely to this work, 160 were engaged in the common schools, and 18 were active merchants (*Berufs-Kaufleute*). The total attendance at the *Lehrlingsschulen* was 4,778; including 243 girls. The four higher departments were attended by 569 students and the 5 private schools by 1,085 students. The total attendance at all of the 48 commercial schools of Saxony in 1899 was 5,428, of which number 483 students came from other States of the Empire, and 283 were foreigners.

Time of instruction.—As a rule instruction in these schools is given during the daytime. Of the 3,387 hours of work a week given in all the schools, 387 hours, or 12 per cent, fall before 7 o'clock (in winter before 8 o'clock) in the morning, and 233 hours, or 6 per cent, after 5 o'clock in the afternoon. Sunday instruction is given in three schools.

Income and expenditures.—The total income of these schools in 1899 was 554,887 marks (\$132,063). This amount was derived from the following sources: Contributed by commercial organizations and private persons, 16,345 marks (\$3,890); raised by cities, 25,922 marks (\$6,169); subsidy from the Saxon government, 22,650 marks (\$5,390). The remainder came from tuition fees and entrance fees, which alone annually cover 81 cent of the expenditures. The total expenditures were 567,329 marks (\$135,024). Of this amount, 388,148 marks (\$92,379) represent the salaries of teachers and directors.

Tuition fees.—In the higher commercial schools the tuition fees range from 180 to 240 marks (\$42.84 to \$57.12) a year. In the lower schools the fees vary from 80 to 100 marks (\$19.04 to \$23.80), though in a few instances but 20 to 50 marks (\$4.76 to \$11.90) are required. In the few private schools the fees are generally considerably higher. In one of these an annual fee of 450 marks (\$107.10) is demanded.

Curriculums.—Instead of presenting a general discussion of the curriculums of the commercial schools of Saxony, it has been deemed more to the point to set before the reader one concrete example. For this purpose the commercial school (Handelslehranstalt) of Leipzig has been chosen. Not only is this school probably the leading institution of its kind in Saxony, but it also bears the distinction of having, through the efficiency of its work and the enthusiasm of its founder (the chamber of commerce of Leipzig) and its directors, led to the establishment of the celebrated commercial high school of Leipzig, the first of its kind in Germany.

The Handelslehranstalt of Leipzig consists of two departments, the apprentices' department (Lehrlings-Abtheilung) and the students' departments (Schüler-Abtheilung). Each department, again, offers two courses, a three-year course and a one-year professional course. The curriculums of these four courses and the weekly hours of study are as follows:

Curriculum of three-year course, apprentices' department, Leipzig commercial school.

Studies.	Hours per week.		
	First year.	Second year.	Third year.
German	1	1	1
English		2	2
French	2	2	2
Commercial arithmetic.....	4	3	2
Theory of commerce.....		1	1
Bookkeeping and office work.....		1	2
Business correspondence.....			1
Commercial geography.....	1	1	
Penmanship.....	2		
Stenography.....	2	1	1
Total	12	12	12

For admission the applicant must have completed the common school course and be able to pass the entrance examination, and must be an apprentice in some local mercantile house. The latter provision is perfectly just, in view of the fact that the school is maintained by the local chamber of commerce.

Curriculum of one-year course, apprentices' department, Leipzig commercial school.

Studies.	Hours per week.
English correspondence.....	2
French correspondence.....	2
Commercial arithmetic.....	2
Exchange and law of exchange.....	1
Bookkeeping.....	2
Theory of commerce.....	1
Stenography.....	2
Total.....	12

For admission to this course the applicant must possess the educational qualifications which entitle him to the privilege of one year's service as a volunteer, or if a foreigner an equivalent education (in Germany graduation from a six-year secondary school).

Curriculum of three-year course, students' department, Leipzig commercial school.

Studies.	Hours per week.		
	First year.	Second year.	Third year.
PRESCRIBED.			
German.....	4	3	3
English language and correspondence.....	5	4	5
French language and correspondence.....	5	4	5
Mathematics.....	3	3	4
Commercial arithmetic.....	5	3	2
Physics.....	2	2	2
Technology.....			2
Chemistry.....		2	2
Study of materials.....			1
General and commercial geography.....	2	2	2
General and commercial history.....	2	2	2
Commerce and exchange.....		2	1
Bookkeeping and office work.....		3	3
Economics.....			2
Penmanship.....	2	2	
Stenography.....	2	1	1
Turning (gymnastics).....	2	2	2
Total.....	34	35	37
OPTIONAL.			
Spanish.....			2
Italian.....		2	2
Russian.....		3	3

Applicants for admission to this course must submit to an examination covering German, French, geography, history, and arithmetic, for which a common school education is not sufficient, the grade of work being about that of the third year in a secondary school.

Curriculum of one-year course, students' department, Leipzig commercial school.

Studies.	Hours per week.
PRESCRIBED.	
English language and correspondence.....	5
French language and correspondence.....	5
Commercial arithmetic.....	4
Commercial law and law of exchange.....	2
Bookkeeping.....	4
German correspondence.....	2

Curriculum of one-year course, students' department, Leipzig commercial school—Cont'd.

Studies.	Hours per week.
PRESCRIBED—continued.	
Economics and commerce	3
History of commerce and geography	3
Study of materials of commerce	3
Penmanship	1
Total	32
ELECTIVE.	
German (for foreigners)	2
Spanish	2
Italian	2
Russian	3
Stenography	2

For admission to this course the applicant must be a graduate from a six-year secondary school or an equivalent institution in a foreign country. This course is designed particularly for those who contemplate entering the offices of wholesale dealers, large manufacturers, and bankers.

COMMERCIAL HIGH SCHOOLS OF GERMANY.

Origin.—In the educational system of Germany the commercial high schools rank with the higher institutions of learning. They stand on the same level as the celebrated technical high schools, agricultural high schools, and universities. Admission can be gained only through graduation from some nine-year secondary school, like the classical Gymnasium, the semiclassical Realgymnasium, and the non-classical Ober-Realschule; or through graduation from a six-year secondary school coupled with practical experience; or, in case of foreigners, an education considered equivalent. These institutions are of extremely recent development, all having been established within the last five years. At present there are four commercial high schools (Handelshochschulen) in the German Empire, founded as follows: Leipzig, 1898; Frankfort, 1898; Aix la Chapelle, 1898, and Cologne, 1901. A fifth school of this grade is to be opened in Berlin in 1905, the plans for it having been accepted by the commercial organizations interested in its foundation and the outlined curriculum of studies and regulations having been approved by the Government.

Mission of commercial high schools.—Much discussion has been carried on as to the necessity or wisdom of these commercial high schools, and literature on the subject has been rapidly accumulating. Especially in the early days of the Leipzig school did opposition to the idea wax warm. Since then the unqualified success of the Leipzig school, as well as of its three successors, has robbed the arguments of the opposition of much of their strength. Much credit belongs to the chamber of commerce of Leipzig and to Professor Raydt for the prosperity of the school. Professor Raydt's accomplishments, like those of the veteran industrial educator Doctor Stegemann, syndic of the Brunswick chamber of commerce, form a noble monument to the efforts of the German in the field of commercial education.

At the time of the agitation for a commercial high school at Leipzig a distinct need was felt for these institutions. The social standing of

the mercantile classes was in need of elevation through the leaven of a higher education, while the complexity and universality of commercial activities called for a broader and more thorough intellectual preparation for them. The commercial classes of the Empire had for decades found themselves severely handicapped in the maintenance of a social standing in harmony with the importance of their profession because of the absence of higher schools of commerce ranking with the technical high school and the universities, whose graduates might claim the same social rank with the alumni of the latter institutions. In Germany education invests a man with a peculiar social prestige, irrespective of his personality. A certain social status attaches to his formal intellectual attainments, as evidenced by his diplomas. The young merchant whose education ends with graduation from some secondary commercial institution can not claim social equality with the young alumnus of a university, even though in native ability and actual intellectual attainments he prove himself far superior to the man with the diploma. That the lack of this social recognition and prestige is a serious handicap to a merchant both in a private and in a business capacity requires no elucidation. The removal of this handicap was possible only through graduation from some higher institution of learning. Since Germany at the time of the agitation for a commercial high school wholly lacked an opportunity for such a higher education which might with profit be pursued by young men of the mercantile class, in the estimation of leading commercial thinkers and educators, the idea of a commercial high school, equal in rank with the universities and technical high schools, received a warm welcome from all sides and rapidly gained the approbation of commercial men everywhere.

The second mission of the commercial high schools, the dissemination of broader and deeper expert knowledge in the commercial world, is even more important than the foregoing, in view of the marvelous expansion of modern commercial activity and the rapidly increasing complexity of the business relations of those engaged in trade. The possession of such knowledge has become indispensable to-day. Untiring energy and large means no longer suffice to hold old markets at a profit. As this is the day of commercialism, so it is also the day of brains. To energy and wealth must be added knowledge—exact, expert knowledge. Competition is keen to the point of danger; profits are measured in fractions; market conditions are complex; competitors are no longer local, or national, but international; commercial calculations have broadened out until they embrace the globe; commercial operations have expanded until they have become world operations demanding world knowledge. For the attainment of such knowledge Germany offered no opportunity prior to the establishment of the commercial high schools. There were but the commercial schools already discussed, the higher commercial continuation schools, and the Oberreal and Real schools. The latter, in spite of the excellent opportunity for a general business education they offered, were entirely inadequate for the professional education of commercial men, since they provided no special courses for them. Nor did any opportunity offer for the teachers of commercial subjects to acquire a higher education, for the secretary of a chamber of commerce, the administrative official, the consular officer, the president of a commercial organization, to equip himself with special commercial

knowledge. The need for some higher commercial institution was palpable; the rapidly developing commercial interests of the Empire called for it; and it was to fulfil these various missions that, in spite of powerful opposition, the great commercial high schools of Germany were, one after another, called into existence.

Opposition to commercial high schools.—Typical of the objections raised by those who ridiculed the idea of a commercial high school is the following excerpt from the annual report of the chamber of commerce of Hamburg for 1897:

The science of business is a science which must be learned by practical experience. It can not be picked up on the benches of a class room. It must be acquired in practical life. A young man trained in a commercial high school will enter on practical life with his head full of all manner of preconceptions. But in spite of all his theoretical knowledge he will have to begin again from the beginning when he enters practical life. The precious time spent by him at the commercial high school will be largely wasted, and often there will be nothing but his academic tricks of style to remind him or his associates that he once studied the science of commercial life.

Other objections raised were the disinclination of young men with a higher education to submit to duties involving the performance of daily mechanical and clerical work. The moral dangers that beset students at higher institutions of learning because of their "academic freedom" (*akademische Freiheit*) were also pointed out,^a the argument being emphasized by indicating the immense value of moral strength and uprightness in commercial life. Doubt was also manifested whether the attendance would be sufficiently large, inasmuch as the students would necessarily be drawn quite exclusively from the class of larger merchants, manufacturers, teachers of commercial schools, and administrative officials, who, it was contended, might today acquire all the special knowledge they needed at universities and technical high schools. If necessary, it was urged, special departments might be organized at these latter institutions to meet the need of expert instruction on certain commercial subjects.

These objections have, however, thus far been discredited by the uniform success of the four existing commercial high schools. Not only was the attendance large from the beginning, not only is it rapidly increasing with each year, but the men who have gone out from these schools have vindicated the value of the instruction given there by making a place for themselves in the mercantile industry of the Empire. Already some of the schools are proudly gathering the records of their alumni as splendid monuments to the value of the instruction which they offer.

Organization.—Serious questions were also raised when the organization of these schools was under consideration. Ought they to be established independently or ought they to be associated with some other existing higher institution, such as a university or technical high school? If the latter organization were decided upon, ought the commercial school to form an integral part of the university, a regular "college," or ought it to preserve its individuality as an institution, and be merely "associated" with the university, the work of the school of commerce being correlated with that of the university?

Various forms of organization are now on trial. When the question was first raised, in connection with the commercial high school at Leipzig, in 1898, it was decided not to make the school an organic part

^a It is a peculiar fact that while the wisdom of "academic freedom" in German universities is almost universally defended, its attendant moral dangers are quite as universally admitted.

of the University of Leipzig, but to establish it on a correlative basis, professors of the university lecturing in the commercial high school and students of the commercial high school attending lectures in the university. Thus far this organization seems to have been generally satisfactory. The commercial high school of Frankfort was established in connection with the "real" school of that city, while the one at Cologne was established as an independent institution. The school at Aix la Chapelle, on the other hand, was organized as a department of the technical high school of that city. Every opportunity is hence offered for a varied and valuable experience.

On general principles it would seem that the best mode of organization would be reached by correlation with or incorporation in a technical high school or university. Not only would this insure an unquestioned academic rank on the part of the graduates, but a considerable economy ought also to be effected through a saving in buildings and salaries of special instructors, while at the same time a much wider range of elective studies would be placed within the reach of students.

COMMERCIAL HIGH SCHOOL OF LEIPZIG.

Origin and administration.—The celebrated commercial high school of Leipzig has the honor of being the pioneer in this field, it having been established in 1898 by the chamber of commerce of that city, which assumed full financial responsibility for the institution. In common with all the industrial schools of Saxony, this school is subject to the general supervision of the Saxon minister of the interior. Its direct administration is vested in a senate, consisting of the following eleven members: The president of the chamber of commerce, who is the presiding officer of the senate, three professors of the university, one representative of the Saxon government, one representative of the city of Leipzig, two representatives of the commercial school (Handelslehranstalt) of the city, two members of the chamber of commerce (exclusive of the president), and the student director of the institution. Here is another admirable illustration of a well-composed administrative body in which every interest finds a voice.

Entrance requirements.—Four classes of students are admitted to the commercial high school: (1) All graduates of secondary schools with nine-year courses, such as the Gymnasium, Realgymnasium, or Ober-Realschule; (2) graduates from higher commercial schools (höhere Handelsschulen) whose upper classes are equivalent to the highest class (Oberprima) of a nine-year secondary school; (3) German teachers with seminary training and education who have passed the qualifying examination as teachers in the Empire; and (4) young merchants and manufacturers who have graduated from a secondary school with six-year course, and have thereafter completed their time of apprenticeship in business.

Curriculum.—Certain courses of lectures are given in the commercial high school building, and others may be attended at the university. Thus in the summer semester of 1903 the following courses were given at the university as credited work in the commercial high school: Eight different courses in political science and economics—finance, statistics, money and banking, exchange, sociology in its practical aspect, elements of economics, and elements of political science; 3 courses in law—international, administrative, and commercial;

3 courses in commercial geography; 1 course in applied chemistry; and 5 courses in pedagogy, designed particularly for students contemplating entrance into the teaching profession. In addition to this a long list of courses is recommended to students as particularly valuable for those who wish to carry extra work. In the commercial high school building itself are taught commercial arithmetic, bookkeeping, and general commercial technology. Special courses in stenography and typewriting have also been arranged. Modern languages are taught by capable professors of the university, emphasis being placed upon English, French, Italian, Russian, and Spanish.

Attendance.—The total attendance during the winter semester of 1902–1903 was 519. So large was the percentage of foreign students that the school practically assumed an international character, and offered an unexcelled commercial education not to a kingdom or to an empire, but to the world. Out of the 519 students 306 were Germans and the remaining 213 were foreigners. The leading countries represented were: Russia by 110 students, Austria-Hungary by 46, Switzerland by 9, Bulgaria by 9, Servia by 8, Turkey by 6, Great Britain by 5, Sweden by 3, Greece by 3, France by 2, Denmark by 2, Holland by 2, Norway by 2, Asia by 2, and South America by 1. Of the 519 students 279 were 21 years old or younger, 18 were over 30, and 47 over 26 and under 30. By far the greatest number of students possessed a good practical education. More than one-third of the students came from the ranks of merchants and manufacturers, young men who had completed their apprenticeship after graduation from a six-year secondary school (Progymnasium, Real-Progymnasium, or Realschule), or after the completion of six years of work at a nine-year school. These students had hence received a good foundation in the form of a broad general education, followed by a period of apprenticeship, and now crowned their preparation for a professional career with a course at a commercial high school. About one-fifth of the total number of students came from classical nine-year schools, and a few from semi-classical and nonclassical nine-year schools. The commercial high school of Leipzig has made wonderful progress. In 1901 the total attendance was but 353—228 of them Germans and 125 foreigners. The prominence of Russian students is significant of the development of that country. It is a common practice of Russians to attend German industrial schools of all the better grades. They are found in the textile schools, the engineering schools, the agricultural high schools, the mining schools, and the technical high schools. Everywhere the Russian has found his way into the halls of learning of the German Empire.

COMMERCIAL HIGH SCHOOL OF COLOGNE.

Origin.—The commercial high school of Cologne, founded May 1, 1901, was the first independent institution of its kind to be established in Germany. It owes its existence to the endowment of a public-spirited citizen and merchant of that city, Gustav von Mevissen, who, as early as 1879, conceived the idea of a commercial high school and gave a considerable fortune to the city for the erection of such an institution. At his death, in 1899, he increased this sum, advantage of which had not yet been taken, to 1,000,000 marks (\$238,000), while the city of Cologne voted an additional fund of 260,000 marks



LECTURE HALL IN COLOGNE COMMERCIAL HIGH SCHOOL.



(\$61,880), and decided upon the erection of an appropriate building. Equipped with these liberal means the school took every care to make the most of them, and today offers a standard of instruction quite befitting an institution housed in a magnificent building of distinct architectural beauty.

Board of regents.—It is a noteworthy fact that the German schools of all classes are directed and supervised by carefully selected Kuratoriums. These bodies are invariably composed of men representative of interests most closely related to and most vitally affected by the activity of the institution. The Kuratorium consists of the following members: the mayor of the city as presiding officer, one representative of the Prussian government, three members of the city council, two members of the local chamber of commerce, one representative of the family of the founder, and four members of the faculty of the school. That such a body is fitted to provide for the welfare of the school can not be questioned. The city can speak for its administrative interests, the Government for its supervisory ideas, the chamber of commerce for the practical aspects of a commercial education, and, finally, the members of the faculty for the best application of ideals of organization and management in raising educational efficiency.

Entrance requirements.—The entrance requirements for the Cologne school resemble closely those established for the commercial high school of Leipzig. Applicants for admission must be either graduates from secondary schools with nine-year courses, graduates from higher commercial schools considered equivalent to these in their standard, merchants who are graduates from secondary schools with six-year courses and who have had at least two years of practical experience in their trade after graduation, foreigners who possess an educational preparation considered equivalent to the preceding requirements.

Tuition fees.—On entrance a matriculation fee of 20 marks (\$4.76) is charged. The regular tuition fee, entitling the student to a seat at any or all lectures, is 125 marks (\$29.75), a semester for German students, and twice that amount for foreigners. Those who attend lectures by choice (*Hospitanten*) pay 10 marks (\$2.38) for every hour a week for a semester if Germans, and twice that amount if foreigners. Public lectures are given in the evening and may be attended on the payment of 10 marks (\$2.38) a semester.

Course.—The course of instruction occupies two years of two semesters each. The spring semester opens on April 15, though students may be matriculated until May 13. In the fall the time for matriculation is from October 15 to November 12.

Curriculum.—Political economy—elements of political economy, transportation, commercial and colonial politics, social problems, organization of the world's commercial organizations, exchanges, insurance, history of commerce, public finance, industrial and agricultural politics, statistics, money, and banking. Law—elements of public law, commercial law, maritime law, law of exchange, law of insurance, elements of judicial procedure in Germany and foreign countries, laws of bankruptcy of leading countries, elements of constitutional law, administrative law, international law, colonial law, industrial law (including patent rights, trade-marks, pattern registration, etc., both in Germany and foreign countries), general, social, and industrial legislation. Geography and technics—general geography, materials and commodities of trade, colonial industries, general commercial geogra-

phy, physics, chemistry, mechanics, general engineering, industrial sanitation, bookkeeping, commercial arithmetic, correspondence, and office work. Languages—English, French, Spanish, Italian, Russian, Danish, Norwegian, Dutch, and German (for foreigners). General culture—German history, foreign history, history of art, history of literature, and philosophy.

As in all German schools of the highest rank, no compulsory curriculum is maintained. Every student is at liberty to choose his studies as he sees fit, and every student is supposed to know just what he came for. The fullest opportunity is thus afforded for the free development of the individuality of the student, and for his education in the direction of his greatest interest.

With the success of the school from the point of view of attendance there followed a rapid expansion of its curriculum. The following table shows the remarkable increase in the number of courses of lectures during the four semesters that cover the existence of the school.

Courses of lectures in the Cologne commercial high school.

Semester.	Public lectures.		Private lectures.		Total.	
	Courses.	Hours a week.	Courses.	Hours a week.	Courses.	Hours a week.
First.....	9	12	24	68	33	80
Second.....	13	19	44	106	57	125
Third.....	17	24	56	129	73	153
Fourth.....	18	22	69	163	88	186

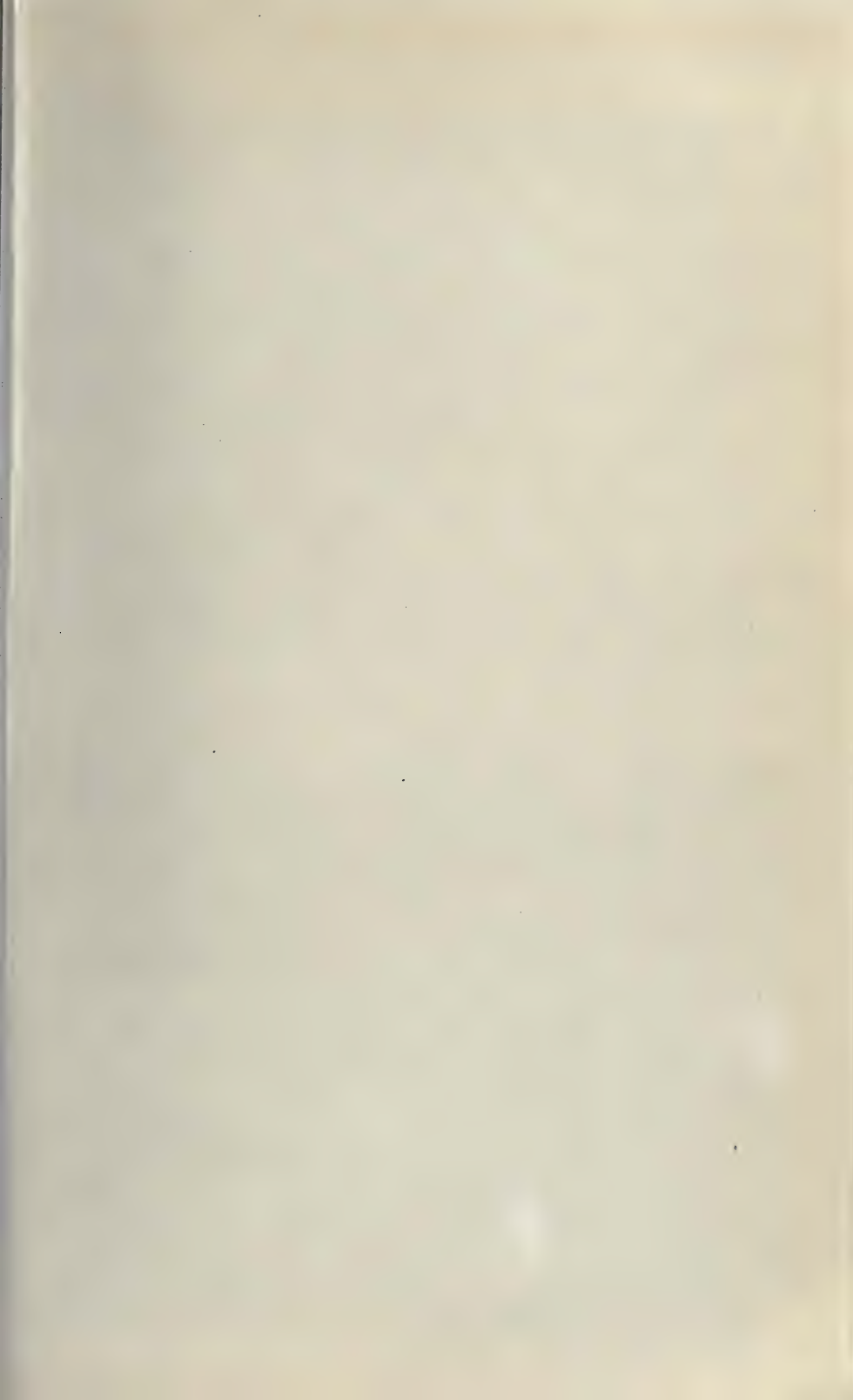
From this it appears that in the brief space of two years the number of courses given as private lectures increased threefold, while the total number of hours of instruction a week, or, in other words, the educational opportunities offered, were increased more than twofold. These facts are eloquent testimony of the prosperity of the institution and the value of its work.

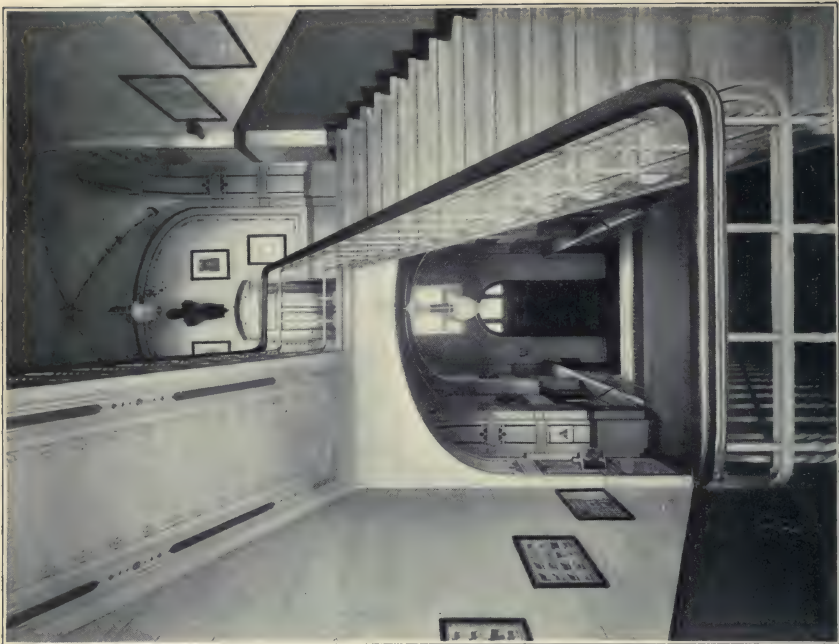
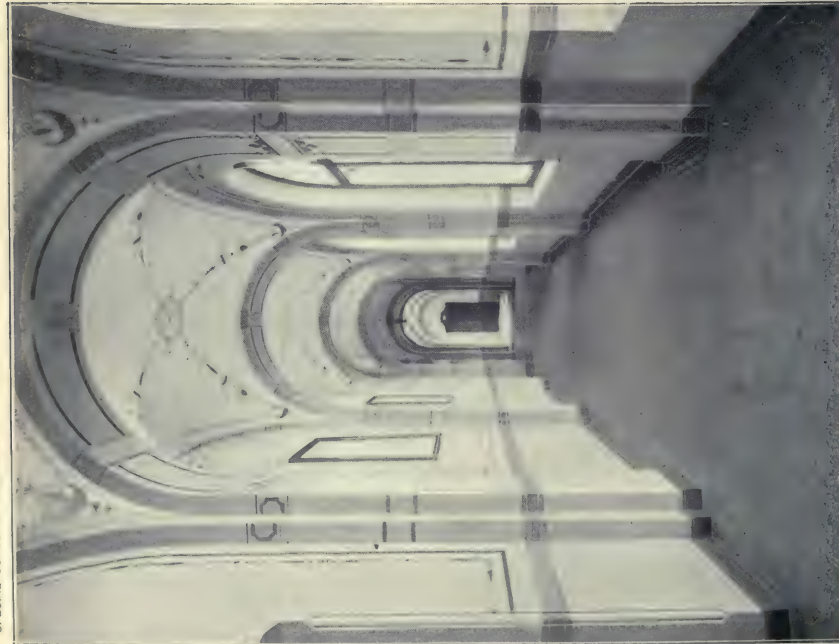
Attendance.—The rapid and continuous increase in attendance at the Cologne school shows both a need for and an appreciation of the instruction given there. The following statement presents the increase in the enrollment during the two years of life of the school:

Attendance at the Cologne commercial high school.

Class of students.	Semester.			
	First.	Second.	Third.	Fourth.
Regular.....	68	119	146	198
Seminary.....	18	17	7	8
Special.....	44	46	52	60
Hearers (irregular).....	633	645	545	1,271
Total.....	763	827	750	1,537

In this body of attendants at lectures the kernel of the institution is to be found in the 198 regularly matriculated students. Of this number 181 were Germans and 17 were foreigners. It is significant that of the 181 Germans but 41 were students who came directly from a nine-year secondary school, while 140 entered fresh from the ranks of merchants and manufacturers, after having completed the stipulated two years of apprenticeship. It will be remembered that in addition to this, appli-





CORRIDORS IN COLOGNE COMMERCIAL HIGH SCHOOL.

cants for admission of this class are required to have graduated from a six-year secondary institution prior to entry upon their period of apprenticeship. Of the 140 German students, 27 belonged to the city of Cologne; 50 came from other Prussian provinces, as follows: Westphalia, 24; Hesse, 10; Brandenburg, 7; Saxony, 6; Silesia, 5; Hannover, 4; Schleswig-Holstein, 2; East Prussia, 2; Posen, 1. Other members of the Empire sent students as follows: Bavaria, 14; Baden, 9; Saxony, 5; Württemberg, 4; Hamburg, 4; Alsace-Lorraine, 2; Braunschweig, Oldenburg, and Saxony-Gotha, 1 each. This well demonstrates the wide interest taken in the school.

The 17 foreigners who attended the school came from the following countries: Holland, 6; Russia, 3; Austria-Hungary, 3; Sweden, 2; Japan, 1; England, 1; France, 1.

Teachers.—Especially commendable is the policy of the board of directors in engaging a force of practical instructors. The real value of instruction in commercial branches lies largely in the kind of information presented to the student and the grasp of the man who presents it, whether academic or practical. In Cologne the danger of the presence of too much of the philosopher's hood is avoided by the engagement of practically trained and commercially engaged men to lecture in some of the most important and valuable branches. Thus a judge and several active lawyers give lectures on the legal subjects embraced in the curriculum; a railroad official lectures on transportation; an industrial inspector lectures in his particular field; an old member of the largest banking house of Cologne lectures on money and banking; a Government official in the insurance service lectures on insurance, and a customs official lectures on tariff technicalities. That eminently practical instruction is delivered by such a corps of men, coming fresh from the industrial world of to-day and deeply imbued with its difficulties; its development, and its future, is certain.

On a minor scale this practice of calling in professional men to lecture before a class of students in a commercial school is followed by the various American universities which maintain schools of commerce. The writer knows from his own experience in Wisconsin that very frequently men of high standing in the world of insurance or transportation were called to the university to speak to the students in the classes for insurance or transportation. The same was done in some other classes, as well as in other universities. Only recently an active and able consular officer was called from his post to deliver a series of lectures before students in the school of commerce of a western university. This practice is but in its youthful stages, as are also the schools of commerce in American universities. With its growth there will be injected a healthful vein of the practical, which will form the bone and sinew around which may gather the theoretical and philosophical. Its growth will bring commercial schools and commercial life a step closer. There is no doubt in the writer's mind that the German commercial high schools, or commercial universities, are far superior to similar schools now being organized in the United States in the infusion of a strong current of practical instruction delivered by men actively engaged in commercial pursuits and bristling with information and pointers freshly gathered in a wide and varied experience out in the industrial storms and calms that hold sway where men battle with one another for the survival of the fittest.

16. INDUSTRIAL ART SCHOOLS.

CHARACTER OF THE SCHOOLS.

Most recent of all the German industrial schools are the schools for industrial art (*Kunstgewerbeschulen*). As their name tells, they aim at the utilization of art in industry. They teach the method and develop the ability of applying the graceful and harmonious forms to practical objects of trade and consumption. What once was made simple, durable, and serviceable is to be so produced that it possesses, in addition to these necessary qualities, the attraction of things beautiful. The vase, the candlestick, the lamp, the table, the dress pattern, the engraving are all to have the delicate lines and the artistic forms of modern art. The architect is to learn how to build structures whose exteriors and interiors present the harmonious blending of well-conceived art; the sculptor is to learn how to chisel for us statuary that reveals a classic taste for the beautiful; the painter is to learn how to reproduce the wonderful harmonies of nature. In short, the artisan in any trade is to be more than a mechanical producer of useful commodities. He is to learn how to make his work beautiful and harmonious. Wonderful is the work that has already been accomplished in Germany by these schools. In shop windows everywhere the lavish display of countless beautiful conceptions of industrial art are eloquent testimony of the effectiveness and value of these institutions.

INDUSTRIAL ART DEVELOPMENT IN EUROPE.

It was France, the land of things fashionable and beautiful, that first opened the eyes of the world to the charm and fascination of clever products of industrial art. Her supremacy in the display of tasteful, artistic articles of all descriptions and uses at the World's Fairs of 1851, 1855, and 1862 was universally recognized and commented on. The cause was not far to find. For centuries, especially since the time of Colbert, France has cultivated the sense of the artistic and beautiful through a highly developed system of education in art. French art, though partly native, is largely cultivated. So complete was the ascendancy of this country that other nations undertook to copy her methods.

The years 1860 to 1870 formed an era of the establishment of museums and schools of industrial art in all the leading countries of Europe. England in 1857 founded the now celebrated South Kensington Museum; Austria in 1863 established a museum for art and industry, and in 1868 added to this a school of industrial art (*Kunstgewerbeschule*) at Vienna; Germany in 1865 founded the industrial museum (*Gewerbehalle*) at Karlsruhe, in 1867 the museum for industrial art at Berlin and the national museum at Munich, and in 1871 the school for industrial art at Leipzig. Switzerland also joined in the movement during this period and established schools for industrial art at Geneva and Chaux de Fonds.

With these beginnings in the leading countries of Europe, industrial art education developed rapidly. In Germany art associations (*Kunstvereine*) were formed in all of the larger cities. Foremost among them were those of Munich, Pforzheim, Frankfort, Karlsruhe, Stuttgart, Berlin, Oldenburg, and Dresden. Another great step in advance was taken when, in 1883, these various associations, discerning the advantages of cooperative effort for the accomplishment of a common end, resolved upon the formation of a general association embracing the entire Empire. The result was the organization of the German Art Association through the consolidation of all the important local organizations.

EDUCATION FOR INDUSTRIAL ART IN BERLIN.

One of the leading institutions of Germany offering an education in industrial art is located in Berlin. It consists of two bodies, which have been brought into close relation as to aims and courses of study, one being complementary to the other. One is the school of arts (*Kunstschule*), and the other is the celebrated institute of the industrial art museum (*Unterrichtsanstalt des Kunstgewerbe-Museums*). The former occupies the position of a preparatory school to the latter, although each represents an independent educational unit. Students prevented from taking a long course in industrial art enter their trade on completion of the *Kunstschule*. Others continue work in the institute of the art museum. Since the course of study in the art school alone occupies two years, it has been found that a large majority of students take up some profession after finishing this course.

SCHOOL OF ARTS.

Curriculum.—The main studies of the school of arts are drawing of ornamental objects and architectural designs, plain sketching from plastic models, drawing of heads and figures from plaster of Paris casts and from living models, drawing and painting of living plants, modeling of ornaments and figures, sketching of outlines, anatomy, history of art, method of instruction in drawing. These studies are grouped and divided in recognition of the particular needs of (1) architectural and furniture designers, decorators, carpenters, locksmiths, etc.; (2) sculptors, modelers, chasers, wood carvers, etc.; (3) painters, sample designers, and pattern drawers.

Courses.—One day course (*Tageschule*) and one evening course (*Abendschule*) are given. In the day school instruction is given between 8 in the morning and 4 in the afternoon, and continues for the period of two years. It is attended by students who can devote all their time to the acquisition of an art education. The evening course was organized to meet the needs of those students whose limited means necessitate the performance of daily work in earning a livelihood. Instruction is given from 5 o'clock in the afternoon until 10 o'clock in the evening, and includes about six hours a week for each branch. The curriculum is arranged for a one-year course. It is assumed that day scholars, who devote all their time to art study, have learned some trade prior to their entry into the school.

Examinations.—Examinations are held in all classes at the end of each semester. At the end of the school year a final examination

(Schlussprüfung) is held in the day school for the purpose of ascertaining which scholars are qualified to pursue further studies in the Institute of the Industrial Art Museum.

Attendance.—The attendance has not fluctuated much during the last few years. In 1896 a total of 601 students were registered in the day and evening schools. Of these 414 were boys and 187 were girls. In 1899 the total number had risen to 702, and in 1901 it had fallen to 685. About one-half of the students are enrolled in the evening school, showing that a large percentage are without special means. The proportion of boys was greater in the evening school than in the day school.

INSTITUTE OF THE INDUSTRIAL ART MUSEUM.

Character of the work.—Those students who pass the qualifying examinations in the school of arts may enter the institute of the industrial art museum (Unterrichtsanstalt des Kunstgewerbe-Museums). Like the school of arts, this institution is divided into a day school and an evening school. The day school is distinctly a professional institution, in that the courses of study are specialized for various trades. Every student must have decided upon some special calling and his studies are arranged accordingly. The professional classes (Fachklassen) assume the character of work in studios or workshops, and are grouped under three general heads, according to whether the work is related most intimately to architecture, modeling, or painting. Students are expected to have thoroughly mastered all technical features connected with their professions, and lying outside of the field of art, prior to their entry into the institutions. The courses of study occupy, on an average, three years. The work in the evening school of this institution is more general and theoretical than that of the day school. It assumes the character of a broad preparation for different professions.

Attendance.—In 1901, 343 students attended the institute of the industrial art museum. Of this number 82 were under 20 years of age, 151 were between 20 and 25, and 110 were above 25. Two hundred and eleven students had learned a trade after completing the common schools, and had then entered the institute for an art education; 132 students had attended a secondary school before taking up their art study.

Seventy-seven of the students were painters, 75 sculptors, 52 architects, 25 porcelain painters, 3 wood carvers, 16 carpenters, 13 lithographers, 24 cabinetmakers, 3 copper etchers, 13 chasers, 6 engravers, 5 glass painters, and the rest scattered among the various professions requiring some training in art.

ROYAL SCHOOL OF INDUSTRIAL ART AT MUNICH.

Departments.—As the name Royal School of Industrial Art (Königliche Kunstgewerbeschule) implies, this school is a Government institution. It consists of two distinct divisions—a department for men and a department for women. The former was founded in 1868 and the latter four years later, in 1872. In common with the other industrial schools of Bavaria, this school is under the supervision of the Bavarian ministry of interior for church and school affairs (Ministerium des Innern für Kirchen- und Schulangelegenheiten). The

departments of the school occupy independent buildings, follow independent courses, and are governed by independent statutes.

Courses, fees, and scholarships.—The school year begins in October and ends in July. Instruction is given daily (except on Sundays, holidays, and Saturday afternoons) from 8 to 11.30 a. m. and 2 to 5 p. m. The regular courses occupy three years, though in some trades four or five years are advised, in order to develop originality and independence in the work. The curriculum is divided into a preparatory course (Vorklasse), a special series of courses (Fachklassen), and supplementary lectures.

The entrance fee is 10 marks (\$2.38). The tuition fee for the winter semester is 20 marks (\$4.76), and for the summer semester 10 marks (\$2.38). Foreigners pay double these fees. A sick fund fee is also levied, amounting to 2 marks (47.6 cents) for the winter semester and 1 mark (23.8 cents) for the summer semester. After the lapse of one semester capable German students may be relieved of part payment of the fees. Scholarships of various kinds are also granted. Unusually bright but poor students are annually aided through the Maximilian scholarship of 360 marks (\$85.68) a year. Traveling scholarships of 720 marks (\$171.36) are also granted. Through private and local circle (government) funds various other scholarships have been established.

Entrance requirements.—Applicants for admission must have attained the age of 15 years, and may not be older than 30. Proof of a good elementary education in drawing must be furnished in the form of sample work, which is submitted to the authorities of the school. As a final test every applicant must submit to an entrance examination.

Curriculum.—The following is a programme of the course of study in the school for men, with the number of hours a week devoted to each.

Course for designers, decorative painters, lithographers, painters on glass and china, etc.:

First year, linear drawing and aquarelle work, 7; ornament drawing, 21; ornament painting, 9; history of art, 1; style, 1; geometry and projections, 3. Second year, architectural drawing, 7; ornament painting and flower drawing and painting, 10; history of art, 1; style, 1; perspective and shadows, 2; anatomy, 1, and either ornamental designing, figure decoration, decorative painting, or glass and china painting, 10. Third year, architectural drawing, 7; figure drawing, 10; anatomy, 1, and either ornamental designing, figure decoration, decorative painting, or glass and china painting, 24.

Courses for architectural draftsmen, model makers, sculptors, jewelers, chasers, etc.:

First year, linear drawing and aquarelle work, 7; ornament drawing, 9; modeling of ornaments and of the human figure, 21; history of art, 1; style, 1; geometry and projections, 3. Second year, architectural drawing, 7; drawing and modeling of the human figure and modeling of ornaments, 20; history of art, 1; style, 1; perspective and shadows, 2; anatomy, 1; and either xylography, architecture, sculpture, or chasing, 10. Third year, architectural drawing, 7; drawing and modeling of the human figure and modeling of ornaments, 10; anatomy, 1; and either xylography, architecture, sculpture, or chasing, 24.

The following summary shows the main features of each of these branches of study:

Linear drawing and aquarelle work. This subject, in connection

with the lectures on geometry, projections, and perspective, forms the basis of constructive drawing as taught in this institution. It embraces exercises in drawing from copies of simple geometrical figures, as scroll work, network, checkerwork, framework, etc. The drawings are made in pencil, in ink, and in colors, and represent mainly the decorative features of ceramics and of textiles.

Architectural drawing. Studies in architectural forms as far as they are applicable to the objects of industrial art.

Ornamental drawings. Exercises in outline drawing from gypsum models of ornamental forms, on various scales, with regard to the effects of light and shadows.

Ornamental painting. Exercises in painting polychromatic ornaments of the different art periods; studies from patterns in ceramics and textiles, especially of Grecian vases, mosaics of oriental and Renaissance styles, checkerwork, sgraffito, etc.; transferring relief forms in polychromatic patterns; finishing in aquarelle

Flower drawing and painting. Drawing and painting leaves, flowers, vines, etc., from copies, casts, and living plants, with reference to their use in ceramics, decorating, textiles, tapestry, etc.

Figure drawing. Drawing of simple parts of the human body, followed by drawing of the whole figure from copies and gypsum models; exercises in drawing animals and drapery.

Modeling of ornaments and of the human figure. Exercises in producing plastic ornamental forms of simple and more complex types in various positions; modeling of simple parts of the human body followed by modeling of the whole figure from gypsum models; modeling of drapery and animals.

History of art. Lectures on the development of art in connection with the history of civilization, ancient and modern, treating especially the most important periods and nations and the most distinguished artists and works of art.

Style. Lectures on style; consideration of the most important ornamental forms and their application; explanation of attributes, emblems, allegories, and symbols; heraldry; science of colors; characteristics and theory of style of the formative arts and the various industrial art technics; comparison of historic styles.

Anatomy. Lectures and illustrations with reference to the special work of the student.

Architecture. Studies in those branches of industrial art which pertain mostly to the exterior and interior ornamentation of buildings, including decorative work of the builder and cabinetmaker, ceramic decorations, decorative work of the goldsmith, locksmith, turner, etc.

Ornamental designing. Studies in designing of surface ornamentation; all kinds of textiles, marbled paper, drapery, leather, etc.; embroidery work; lace work; typographical decorations, etching, and engraving, checkerwork, mosaic, etc. Instruction is based upon studies of the older styles, with application of the same to more modern work.

Figure decoration. The studies in this subject are based upon the studies in surface ornamentation by the use of the human figure. They embrace decorative painting of walls, ceilings, windows, etc., typographical decorations, vignettes, etc., in so far as the use of organic forms for ornamental purposes is admissible.

Decorative painting. A special course in decorative wall painting; exercises in painting from plastic copies in single colors, followed by

polychromatic representations; exercises in painting walls and ceilings with reference to Italian and German decorative painting; free decorative representations of flowers, figures, animals, etc., for friezes, panels, medallions, etc.

Glass and china painting. Exercises in connection with studies in decoration of windows and of ceramic objects. These exercises begin with painting simple ornamental surfaces, followed by architectural and figural representations in gray and polychromatic painting, with accentuation of the mosaic principles of the old masters; painting of porcelain and chinaware, vases, etc.

Sculpture. Studies in designing plastic decorations of ornamental and figural character for ornamentations on buildings and furniture, on ceramic objects, and for the metal industry, as capitals, pilaster fillings, friezes, brackets, caryatids, cappings, rosettes, vases, pedestals, stoves, centerpieces, goblets, cassettes, etc. Instruction is based upon correct samples with constant reference to the materials which enter into the construction of the objects. The models are made either of clay, gypsum, wax, or wood.

Chasing. This includes studies and practical instruction in all kinds of metal work pertaining to chasing and engraving. The instruction embraces essentially exercises in metal stamping, chasing, engraving, etching, and enameling in connection with instruction in drawing and modeling of metallic objects.

Xylography. Exercises in wood carving and graphic representation by means of woodcuts in connection with ornamental and figure drawing.

A special course has been arranged for the education of drawing teachers.

School for girls.—In the school for girls instruction is given partly by lectures and partly by practical exercises, and covers the following subjects: Linear drawing, aquarelle, geometry, projection, perspective and shadows, ornament drawing, ornament painting, drawing and painting of flowers, figure drawing—including animals and drapery, style, ornamental forms, history of art. There are also special courses in industrial drawing, decorative drawing and painting, china painting, lithography, xylography, and a course for drawing teachers.

Attendance.—The total attendance in the year 1902 to 1903 was 364. Of these 206 were men and 158 were women. The following table shows the length of time spent in the institution:

Attendance at Munich Industrial Art School.

BY SEMESTERS SPENT IN THE SCHOOL.

Semesters.	Men.	Women.	Total.
1.....	40	17	57
2.....	42	25	67
3.....	37	12	49
4.....	35	29	64
5.....	16	12	28
6.....	15	9	24
7.....	8	12	20
8.....	9	13	22
Over 8.....	4	29	33
Total.....	206	158	364

Attendance at Munich Industrial Art School—Continued.

BY AGE.

Age.	Men.	Women.	Total.
15 years.....	4	2	6
17 years.....	9	7	16
18 years.....	21	15	36
19 years.....	35	23	58
20 years.....	33	22	55
21 years.....	17	18	35
22 years.....	18	18	36
23 years.....	22	13	35
24 years.....	8	11	19
25 years.....	10	3	13
Over 25 years.....	29	26	55
Total.....	206	158	364

BY NATIONALITY.

Nationality.	Men.	Women.	Total.
Germans.....	190	142	332
Bavarians.....	147	122	269
Other Germans.....	43	20	63
Foreigners.....	16	16	32

ROYAL ACADEMY OF GRAPHIC ARTS AND BOOKMAKING AT LEIPZIG.

Character and aims.—The royal academy of graphic arts and bookmaking (Königliche Akademie für Graphische Künste und Buchgewerbe), at Leipzig, is the leading institution of its kind in Germany, and by some writers is considered even to be without a rival in the world. Leipzig, the greatest book center of the world, thus has also the greatest school for instruction in the art of bookmaking. While the academy aims particularly at the cultivation of art in the bookmaking trade, as its title says, it aims also to teach the general descriptive or graphic arts. The entire system of instruction is so arranged and conducted as to develop originality to the highest degree. The graduate of the academy is to be more than a mechanical copier or reproducer of things beautiful in the related trades. He is to be a creator of the artistic and a composer of the harmonious. He is not to search for his patterns and models in the shops of others, but is to find them in nature and in the privacy of his own workshop. Originality in artistic conception is the watchword of the institution.

Courses.—The academy is divided into two schools, a general preparatory school (Vorschule), and a specialized professional school (Fachschule). The Vorschule is designed to teach the elementary principles of the graphic and bookmaking arts, and to enable the student to frame a wise decision as to which special calling he wishes to enter; in the Fachschule instruction is arranged to meet the specific needs of the manifold branches of the bookmaking and graphic art trades. The former lays a general foundation, the latter rears a special structure. The Vorschule requires four years of work, while the Fachschule requires at least three years more. A considerable sacrifice in time and money is hence necessary for the completion of the entire course. An evening school is also connected with the academy, which occupies about eight hours a week during forty weeks of the

year. Students are urged to stay at the academy for at least six years in order to acquire sufficient confidence and independence in their work.

Entrance requirements.—The following qualifications are requisite for admission into the day school: An age of 15 years; good command of the German language as evidenced by the submission of an autobiography; previous employment in artistic work of some kind. In addition to this the applicant must submit to an examination given by the teacher under whom he expects to carry on most of his work. For entrance into the evening school the applicant must also have completed the general continuation school, and if but 15 years old must have attended the trade school of the city for at least one year. After a trial of one semester, incapable students may be discharged. This privilege insures the removal of all chaff among the students, and winnows out the “artists” with mere “hanging on” propensities.

Tuition fees.—In both the preparatory and the professional schools German students pay 30 marks (\$7.14) for one-half year, while foreigners pay 110 marks (\$26.18). In the photographic division the higher charge of 70 marks (\$16.66) for Germans and 270 marks (\$64.26) for foreigners is imposed. In the evening course the fee is 15 marks (\$3.57) for one-half year for Germans and 75 marks (\$17.85) for foreigners. After having given proof of special ability, needy students may be relieved of part of the fees after the end of the first semester.

Trades taught.—Among the special trades for which instruction is given are lithography, xylography, photography, photogravure, engraving, etching, ornamental drawing, chasing, printing (including plain and ornamental printing in books, cards, documents, and other forms of printed page), illuminating, bookbinding (including all forms of binding known to the trade), typemaking (with particular reference to ornamental type), relief sculpture, wood carving, plastic art work, and related professions.

Character of instruction.—All instruction is organized upon an eminently practical basis. Connected with the academy are well-equipped laboratories and workshops, wherein students learn how to apply the theory of the lecture room, and how to make their own tools, cast their own plates, design and develop their own patterns, and prepare the raw material when necessary. It is here that the student has an opportunity to display his originality of artistic conception, and to work out ideas on his own initiative, always, to be sure, under the careful guidance, advice, and correction of the teacher. Here are developed men who go out into the world and enrich their professions with the products of a free originality in art and novelty in classic form.

17. TECHNICAL HIGH SCHOOLS.

PREEMINENCE.

Crowning the German system of industrial education stand the great technical high schools. Their name and fame have gone out into every country where men are interested in the application of science in industry. Though Germany has achieved great things in other fields of education, it is the technical high schools that form the noblest monument to the deep thought, untiring energy, and unquenchable enthusiasm of German educators and statesmen in the field of industrial education. Their history dates back for over a century, and is a story of modest beginning and growth into educational institutions which are to-day the acknowledged peers of the historic universities, and which will in the future, by virtue of their unwavering pursuit of science and their faithful application of knowledge in industry, vindicate their position as the great schools of the age. Their preeminent mission for the enrichment of commerce and industry, for the production of things convenient and comfortable, for the creation of a greater security in life and property, will envelop these institutions in a halo of public esteem, which will eclipse even the historical prestige of the ancient classical universities.

ORIGIN.

The first technical high school of Germany was opened in Berlin in 1799, in the form of an academy of builders (Bau-Akademie). In 1821 a trade school (Gewerbeschule) was also established. These two institutions developed side by side until 1879, when they were combined to form the technical high school. During the years 1799-1821 two schools similar to these in aims and organization were founded at Prague (1806) and Vienna (1815). After the founding of the Berlin trade school in 1821 there followed in quick succession a number of technical or polytechnic schools all over Germany. In 1822 a scientific school was established at Darmstadt, which at a later date grew into a polytechnic school. In 1825, after seventeen years of deliberation and hesitation, a polytechnic school was opened at Karlsruhe. Three schools were established in Bavaria in this period, at Munich (1827), at Nuremberg (1829), and at Augsburg (1833). The Technische Bildungsanstalt was founded in Dresden in 1828. Special technical departments were organized at the "real" or scientific school of Stuttgart in 1829, and higher trade schools (Höhere Gewerbeschulen) were established at Cassel (1830) and Hanover (1831). In 1835 the Collegium Carolinum, at Brunswick, which had fallen behind the times, was reorganized and placed upon a more modern basis. Thus between the years of 1821 and 1835 the foundations were laid of all those institutions except that of Aix la Chapelle (1870), which are to-day recog-



TECHNICAL HIGH SCHOOL, AIX LA CHAPELLE, GERMANY.



nized as the technical high schools of Germany. Though the school at Aix la Chapelle was organized late it did not have to pass through the slow stages of evolution, but benefited by a liberal equipment from the beginning, which enabled it to open its doors in 1870 with a staff of 32 teachers and an enrollment of 223 students.

ORGANIZATION OF EARLY SCHOOLS.

With the exception of the school at Aix la Chapelle, all the technical high schools of Germany date back at least seventy years. The Berlin school dates back even more than a century, it having celebrated its centennial in 1898 (the academy for builders was founded in 1799). It was also seen that these schools developed out of trade and polytechnic schools of lower rank. No uniformity of organization, no homogeneity in structure characterized the early schools. Instruction was meted out to all students alike, no matter what profession was the aim. Entrance requirements were low, and largely for the reason that no schools then existed at which students might first acquire a good practical foundation in the form of a broad general education, such as has now been so admirably provided through the establishment of the "real" schools. The forerunners of the technical high schools were hence necessarily elementary in organization and simple in their work. Their entire administration was conducted as that of a school for boys rather than that of a school for men. No academic freedom was permitted, for the minimum age for admission being fixed at 15 years, the discipline had to be that of a school for boys.

SPECIALIZATION.

But with the advent of the "real" or scientific school, in which young technologists might prepare themselves for a higher technical education, with the advance in technical science and industrial processes, specialization was introduced into the organization. The opportunity for a preparatory education rendered specialization possible; the advance in technical knowledge rendered specialization imperative. Hence there was introduced the principle of the *Fachschule* (professional class), which gave the schools a more modern aspect. During the decade from 1840 to 1850 this principle gained a footing in all of the polytechnic schools, though the lines of division were not always identical. Below the *Fachschule* there was, in every case, a general class where the new students were prepared for their higher work. This arrangement was essential in times when the modern secondary schools were not so highly developed as they are at the present day, and when the conditions for admission were necessarily less stringent. Today these preparatory classes have completely disappeared, the modern technical high schools being modeled on the lines of university organization, each *Fach-Abtheilung* (professional department) corresponding to a faculty in a university.

INFLUENCE OF FOREIGN SCHOOLS.

Among the schools which exerted a vital influence upon the German technical high schools in the period of transition and development may be mentioned the French *École Polytechnique*, which may be singled

out for the strong emphasis which it placed upon mathematics and natural sciences, which form the basis of all technical sciences, and also for the scrupulously scientific spirit with which it prosecuted its work. The polytechnic school of Vienna exerted a strong influence through its organization of the various technical sciences into an educational entity. Finally the Swiss Polytechnikum at Zurich and the German polytechnic school at Karlsruhe (the latter being a leader among the German polytechnic institutions) were prominent in the fostering of a broad general education as a foundation for a technical training, in the encouragement of a strict scientific spirit in the work of the school, in the elevation of the standard for admission, in the introduction of academic freedom in the selection of courses, and, finally, in the introduction of the principle of specialization and the establishment of Fachschulen, or Fach-Abtheilungen.

The influence of these leading technical institutions, coupled with the rapidly developing conditions in the fields of industry and education, carried the German technical schools steadily onward through the three stages of their development from "technical institutes" (technische Lehranstalten) to "polytechnical schools," and finally to "technical high schools," of which Germany to-day possesses nine, located as follows: Aix la Chapelle, Berlin, Brunswick, Darmstadt, Dresden, Hanover, Karlsruhe, Munich, and Stuttgart.

ACADEMIC FREEDOM.

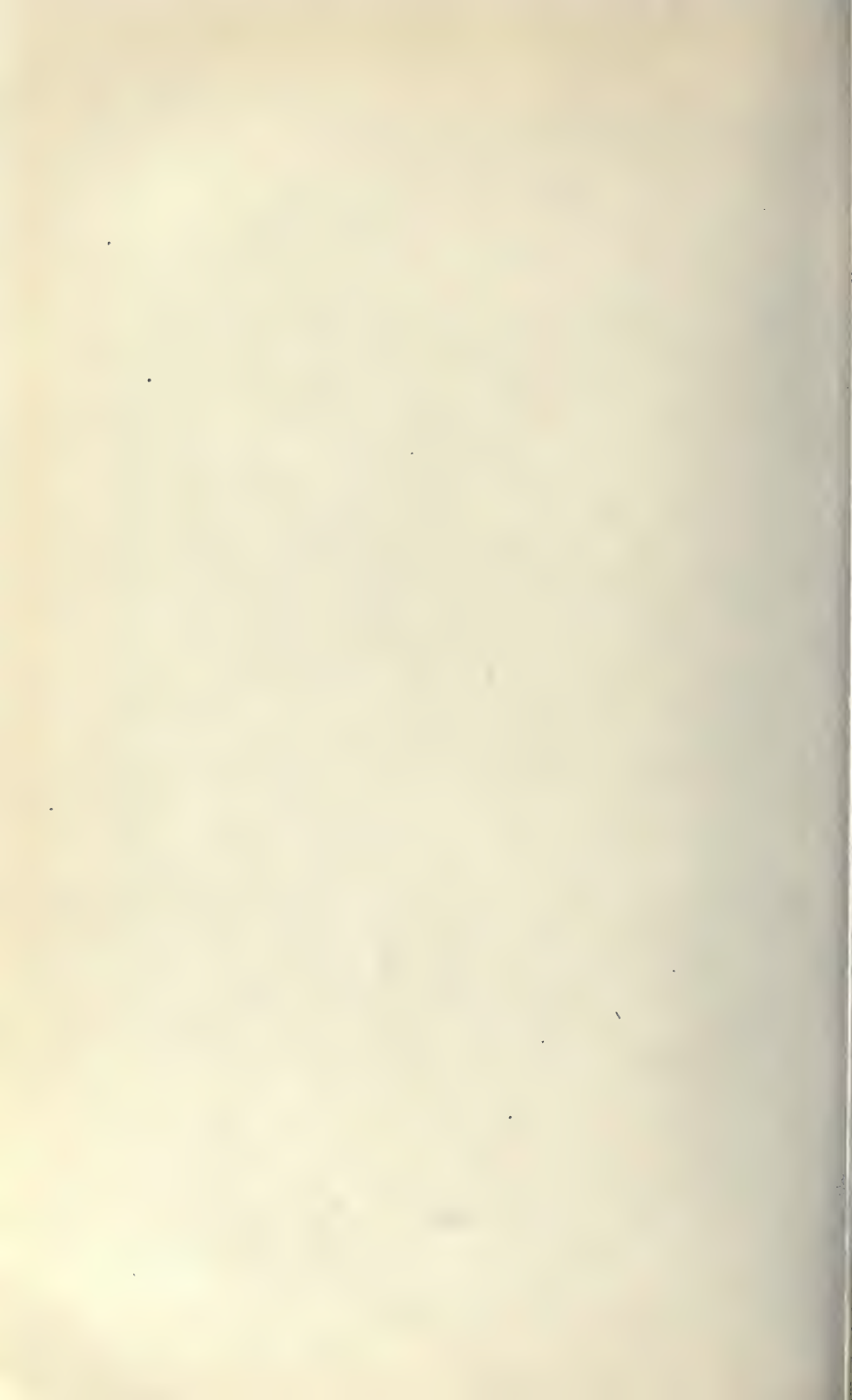
In the development of the technical high schools the ideal of a university seems to have been constantly kept in view. With the abolition of the preparatory classes and the raising of the standard for admission, the principle of academic freedom in the choice of studies (Lernfreiheit), which is another attribute of university organization, was also generally introduced. It is, however, an interesting and significant fact that, although the various technical high schools nominally offer absolute freedom in the selection of studies, they in fact outline the entire course of study for the student through the publication of recommended courses of study in the school catalogues in such a manner as to envelop them with considerable authoritative sanction, and give to them a peculiar force which claims the attention of the student. This seems to be in silent recognition of a conviction of Nebenius (a leading technical educator connected with the Karlsruhe school) half a century ago, when he rejected the idea of Lernfreiheit in technical schools on the ground that in a technical training there is a necessary sequence of studies, and that unless the preliminary branches are thoroughly mastered the subsequent time is wasted.

RELATION OF DEPARTMENTS.

But though today the principle of the specialization of work in departments has been uniformly and universally applied, and though students in these various professional departments pursue courses of study more or less fixed and uniform through authoritative sanction, the principle of separation and division has not been carried to that point where it means isolation in work. Students of one department can, in recognition of their needs and wishes, attend lectures on cognate subjects in another. In this wise each department of study is richly



TECHNICAL HIGH SCHOOL, BRUNSWICK, GERMANY.



benefited and draws great advantage from the combination of a number of such departments in a single institution, as is the case in all of the technical high schools of Germany.

GROWTH OF THE SCIENTIFIC SPIRIT.

In addition to the movement toward specialization and the formation of Fach-Abtheilungen, another great modernizing and developing principle in the technical high schools is found in the readjustment of the aims of the school from institutions which strive to develop in the student manual dexterity and skill in execution to schools wherein is to be fostered, primarily, an earnest pursuit of science for science's sake. From the training of skillful artisans the schools, in the course of their development, turned to the training of skillful scientists. A dauntless, earnest, persevering pursuit of science is preeminently the mission of the German technical high schools of to-day. In it lies the secret of their greatness. Their high aim lifts them at once beyond the realm of the artisan into that of the scientific investigator. These are the schools in which we find the scientific searcher bending over his pot of chemicals from sunrise to sunset. Here were solved the secrets of and acquired the perfection in an industry which has carried the name of Germany into every country where drugs and chemicals are bought and sold. Here are made the great discoveries which are annually revolutionizing German methods of manufacture, cheapening the processes of production, and forcing German commodities into new markets in all quarters of the globe.

A good idea of the character and work of the technical high schools can probably be best conveyed by treating them collectively rather than individually under the following general heads: (1) Administration; (2) organization; (3) entrance requirements; (4) tuition fees; (5) curriculums, and (6) attendance.

ADMINISTRATION OF THE SCHOOLS.

The administration of the technical high school may be considered under two heads—the general governmental supervision and the direct internal administration through the administrative organs of the school itself.

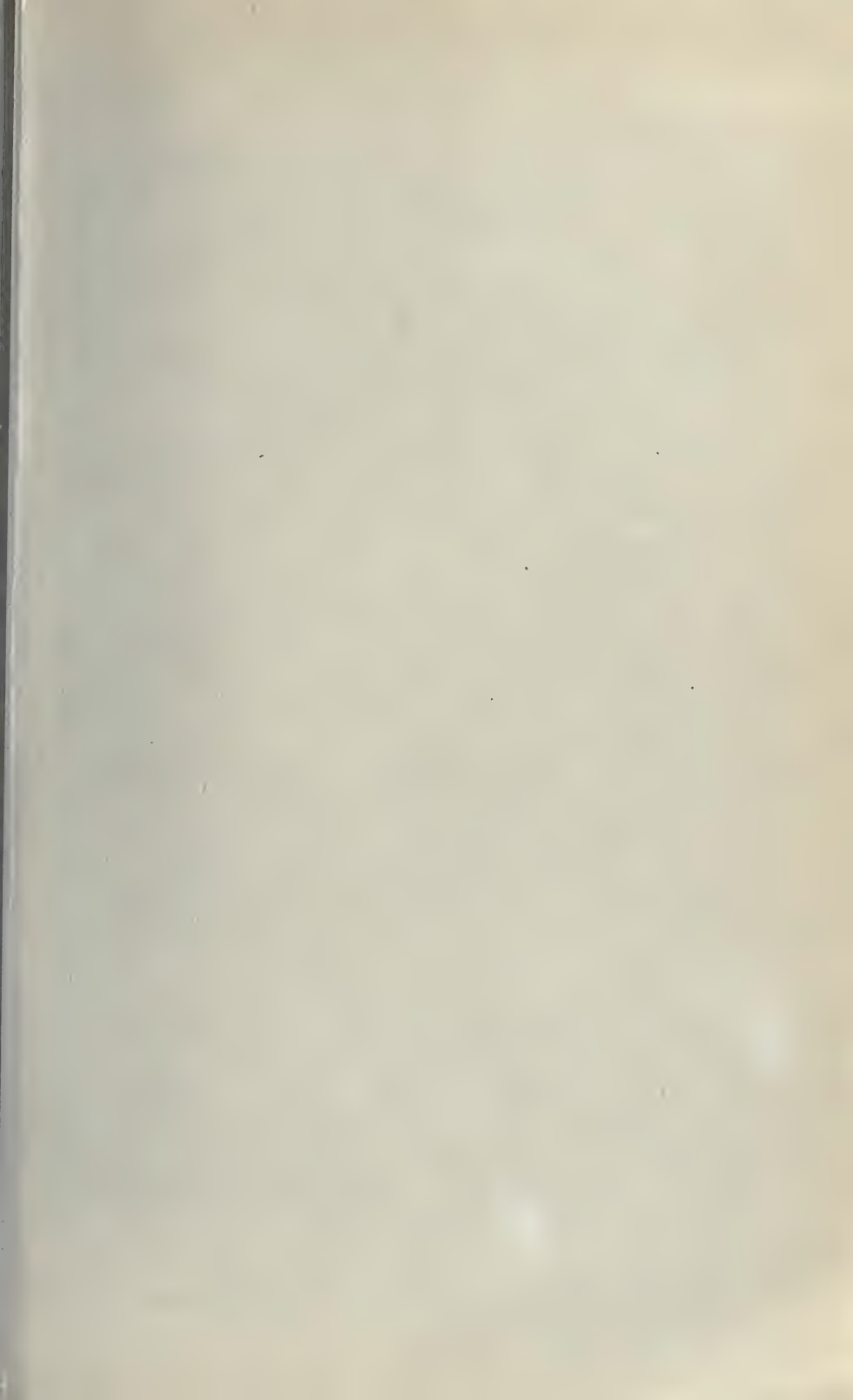
In Prussia the technical high schools are subject to the control of the minister for spiritual affairs (Ministerium für Geistliche Angelegenheiten) in recognition of the preeminently scientific and educational character of these institutions, the same ministerial department supervising the institutions for general education and cultural training as well as for religious training. The lower industrial schools, aiming little at the development of science and striving mainly to create manual dexterity and the ability to produce a skillful and clever product, are, on the other hand, placed under the supervision of the minister for commerce and industry. In the other German States the same general principle is adhered to in the subordination of the technical high schools to that ministry which has charge of church and educational affairs, though it is not invariably true that the lower industrial schools are subject to that ministry which concerns itself with the interests of commerce and industry. Just how the German governments go about the administration of their industrial schools will be told in the next chapter.

Though nominally the State possesses final powers of direction and administration, the immediate administrative bodies of the school virtually control in all affairs which affect the weal of the institutions. Every technical high school has its own constitution, which is formally approved by the State. With such approval the school is given over to the rector and senate, provided for in the statutes of the institution, and continues its career of almost self-government.

The direct and immediate administrative organs of the nine technical high schools possess a striking similarity. At the head of the entire institution stands the rector (Rektor), and the senate (Senat). At the head of each department of the school, as the department for architecture, for engineering, or for chemistry, etc., stands a special departmental college (Abtheilungs-Kollegium) with its "departmental president" (Abtheilungs-Vorsteher). The rector is variously selected. In Saxony (Dresden) and Bavaria (Munich) the rector is appointed by the King. In Saxony he serves one year, while in Bavaria his term of office is indefinite, as he serves "at the will of the King." In Baden the rector is chosen by the "grosse Rat," composed of all members of the various faculties of the school. In some other cases he is chosen by the members of the various departmental colleges meeting in joint session. The time of service is generally one or two years. The predecessor of the acting rector always acts as vice rector, and attends the sessions of the rector and senate. The senate is generally composed of the various departmental presidents, and at times also includes one or more professors chosen at large by the faculties of the different departments. In Karlsruhe the general assembly of all professors is called the "grosse Rat," which chooses the rector. In some schools the departmental colleges consist of all regular professors of the department, while in others a specific number of them are elected as a college by the entire departmental faculty. An administrative body consisting of the faculties of all the departments of the school is found at Darmstadt (grosse Senat); at Karlsruhe (grosse Rat), and at Stuttgart (Senat). The "Senat" of other technical high schools is called "Senatausschuss" in Stuttgart, and "kleine Senat" in Darmstadt, to distinguish it from the larger bodies, "Senat" and "gross Senat," respectively. Though the terminology differs slightly in some schools, the corresponding organs are constructed with great similarity.

All communication of the school with the Government and with the outside world is maintained through the rector and the senate. Communication between the various departments and the rector is maintained through the departmental presidents. Among the main powers and duties of the senate are consideration of departmental reports, suggestions, etc., and their transmission, with criticisms, to the Government; recommendation of teachers, and of changes in the statutes of the school; submission of decisions as to the general arrangement of the curriculums of the various departments (details rest with the departmental colleges); supervision of annual reports; disposition of school buildings; acceptance and discharge of students; supervision of the library; and other matters of general importance to the school.

The departmental colleges are occupied mainly in making recommendations as to details in the curriculum; as to the engagement of teachers in their own colleges; as to the equipment of departmental laboratories, libraries, lecture rooms; as to the disposition of scholar-





TECHNICAL HIGH SCHOOL, DARMSTADT, GERMANY.

ships, release from fees, etc., and disposition of prizes; and in making reports of the details of work and progress in the department, etc.

Every step in the administrative organization as outlined is carefully worked out with admirable precision and system. Every part has its well-defined powers and duties, and though each department is an educational entity it is kept in close relation with every other department and with the institution as a whole. The rector of the school is by courtesy invited to attend all meetings of the departmental colleges, and has access to all their minutes and all other administrative records,

ORGANIZATION OF THE SCHOOLS.

The absence of specialization in the courses of study followed in the predecessors of the technical high schools has already been pointed out. Today the division of these schools into technical departments is universal. Nor are these departments isolated, but continue their work in close correlation—one department offering much of value to students of another department, and vice versa. The nine technical high schools now maintain departments as follows:

Aix la Chapelle—architecture, civil engineering, mechanical engineering, mining, metallurgy, chemistry, electro-chemistry, and general science.

Braunschweig—architecture, civil engineering, mechanical engineering, chemistry (special department for food stuffs), pharmacy, and general science.

Berlin—architecture, civil engineering, mechanical engineering, shipbuilding and naval engineering, and chemistry and metallurgy.

Darmstadt—architecture, civil engineering, mechanical engineering, electrotechnics, chemistry (electro-chemistry and pharmacy), and general science.

Dresden—architecture, civil engineering, mechanical engineering, chemistry, and general science.

Hanover—architecture, civil engineering, mechanical engineering, chemistry and electrotechnics, and general science.

Karlsruhe—architecture, civil engineering, mechanical engineering, electrotechnics, chemistry, and forestry.

Munich—architecture, civil engineering, mechanical engineering, chemistry, agriculture, and general science.

Stuttgart—architecture, civil engineering, mechanical engineering, chemistry (metallurgy and pharmacy), mathematics and physics, and general science.

From the foregoing it will be seen that three schools have five departments; five schools have six departments, and one has seven. Invariably represented are departments for architecture, civil engineering, mechanical engineering, chemistry, and general science. Special departments are found in Karlsruhe (forestry); Berlin (shipbuilding and naval architecture), and Munich (agriculture). In some instances chemistry and electrotechnics are joined in one department (Hanover, Darmstadt, and Aix la Chapelle), and in other cases electrotechnics forms a special department (Karlsruhe). Chemistry and pharmacy are sometimes joined (Stuttgart and Darmstadt), and again pharmacy may form an independent department (Braunschweig). At Stuttgart a special department has been formed for mathematics and the natural sciences, while in most cases these subjects are included in

the department for general science (Berlin, Hanover, Karlsruhe, Braunschweig, Aix la Chapelle, Darmstadt, and Dresden). Braunschweig has special divisions for food stuffs, sugar, and ferments, which are accomplishing a great work.

The foregoing shows that a general uniformity of organization has already been attained by the German technical high schools, though in specific departments lesser modifications and divisions have been introduced.

ENTRANCE REQUIREMENTS.

Four classes of students may be distinguished in discussing the entrance requirements: (1) Regular German students who are graduates from secondary schools; (2) "Hörer," or "Hospitanten," who attend only particular lectures by choice and follow no regular course of study; (3) students from specific secondary schools located in other members of the Empire from that in which the given technical high school is located; (4) foreigners.

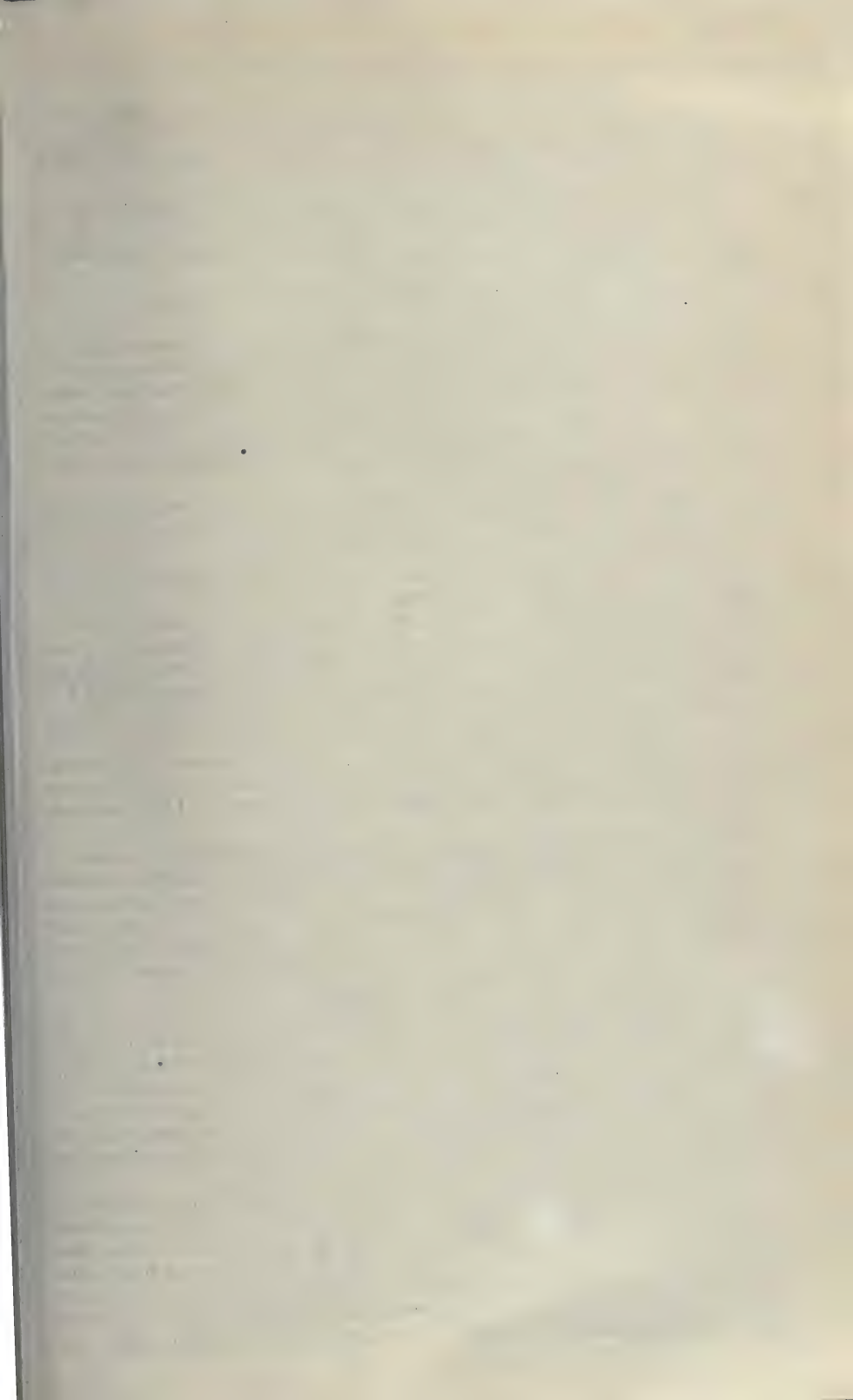
Regular German students must, as a rule, have completed the course at some nine-year secondary school, or an equivalent institution. Certain schools also admit graduates from six-year secondary schools who, in addition, have completed a course at some secondary technical school, such as a school for builders, a school for industrial art, or a technikum, or who possess special advanced qualifications in mathematics.

The requirements for the admission of Hörer or Hospitanten are much less severe. Foreigners may not attend as Hörer. Students who have completed six years of work in some secondary school are generally admitted as Hörer—that is, those who possess the certificate for one year's military service as a volunteer, which is merely, as will be remembered, a military expression used as a measure of educational attainment. At times certain institutions are also placed upon the list of those whose graduates may attend the technical high schools as Hörer.

In much the same way students of specified institutions located in German States other than that in which the given technical high school is located may be permitted to enter the technical high schools as regular students on an equality with the graduates of the nine-year secondary schools. In this way the Bavarian Industrieschulen and the Saxon Royal Industrial Academy of Chemnitz are accredited in most of the Prussian technical high schools.

Foreigners, in order to gain admission to these schools, must be graduates from some institution which is considered an equivalent, and it is considered an equivalent only when it qualifies its graduates for study at some higher institution of learning. (*Reifezeugniss einer zum Hochschulstudium berechtigende Schule.*) Foreigners are generally not admitted to the "Staats-Prüfung" qualifying graduates of the high schools for public service, but they are invariably allowed to take the regular final examinations (*Diplom-Prüfung*).

For admission into special departments of the technical high schools, for which no regular preparatory schools exist, the applicants must generally have passed a special qualifying examination, and must also have had a certain amount of practical experience. Thus at Karlsruhe applicants for admission into the department for pharmacy must have passed the examination for apprentices in the apothecary trade (*Apotheker-Gehilfen-Prüfung*). In some schools—Stuttgart, for





TECHNICAL HIGH SCHOOL, DRESDEN, GERMANY.

instance—it is also necessary to have completed three years of apprenticeship for admission into this department. Stuttgart also demands one year's practical experience in some machine shop for admission into the department of mechanical engineering and electrotechnics.

In Hanover women are admitted to specified courses. Stuttgart has special provisions respecting the admission of Russian students, who study in large numbers at all the German technical high schools. A minimum age of 17 or 18 is also frequently required for admission, as well as good moral character—in Germany evidenced by military, educational, and police records.

TUITION FEES.

A German writer places the amount of the total annual tuition fees paid, on an average, by a student attending a technical high school at 300 to 350 marks (\$71.40 to \$83.30). This sum includes matriculation fees, fees for regular lectures, library fees, etc. At Berlin the matriculation fee is 30 marks (\$7.14); at Braunschweig it is 8 marks (\$1.90); at Munich 20 marks (\$4.76) for Germans and 40 marks (\$9.52) for foreigners. The tuition fees for lectures and practical work are calculated on the basis of every hour a week for the period of one semester. Thus at Berlin the fee for lectures (*Vorlesungen*) is 5 marks (\$1.19) for every hour a week for a semester, while the fee for practical work (*Übungen*) is 4 marks (95 cents) for each hour a week for a semester. The *Hörer* or *Hospitanten* pay a higher fee, amounting to 1 mark (23.8 cents) more for each hour a week for a semester than the fee paid by regular students. At Munich the fees are just one-half as high as in Berlin, while at other technical high schools they range between those charged at Munich and at Berlin.

In addition to the fees charged for lectures and practical exercises, smaller charges are made for the use of libraries, reading rooms, etc. Regular sick-fund contributions of from 50 cents to \$2 a semester are also required.

The laboratory fees range between 20 marks (\$4.76) and 30 or 40 marks (\$7.14 or \$9.52), except in case of students taking chemistry or photography, when a charge of from 60 to 85 marks (\$14.28 to \$20.23) a semester is made. When the laboratory space is rather limited provision is made in the acceptance of foreigners that they must be satisfied with no assignment of a seat in the laboratory. As a rule no discrimination is made against foreign students, though in a few institutions the matriculation fees and the contributions to the sick funds are somewhat higher for them than for Germans.

CURRICULUMS.

An enumeration of the hundreds of subjects upon which lectures are given would be quite useless and confusing. Every subject of importance is dwelt upon in all the schools. A difference in rank in the instructional work is introduced largely by the method of instruction and the special qualifications of the teachers, and not by the subject-matter itself. It will be remembered that all the lectures of one department may be attended by the students of other departments. This practice opens up a wide choice of elective studies. The department of general science (*Allgemeine Abtheilung*) is, in this way, made

the common property of all students. Not infrequently a list of recommended lectures in other departments is appended to the regular class schedule.

Some idea of the comprehensive and thorough manner in which the field of instruction in the various departments is covered can be gathered from the following compilation. In 1902 the six departments of the technical high school at Charlottenburg (Berlin) offered 281 courses of lectures. These were distributed among the various departments as follows:

The department of architecture offered 65 lectures, including courses in the history of art, architecture, ornament, designing, constructive architecture, modeling, drawing, etc.

The department of civil engineering offered 34 courses, including mechanics, railway construction, bridges, canals, harbors, hydraulics, drainage, land surveying, etc.

The department of mechanical engineering offered 54 lectures, including machine construction, kinematics, mechanical technology, machine designing, power machines driven by water, steam, and electricity, electro-technics, electro-mechanics, railway works (especially locomotives and carriages), and electrical works.

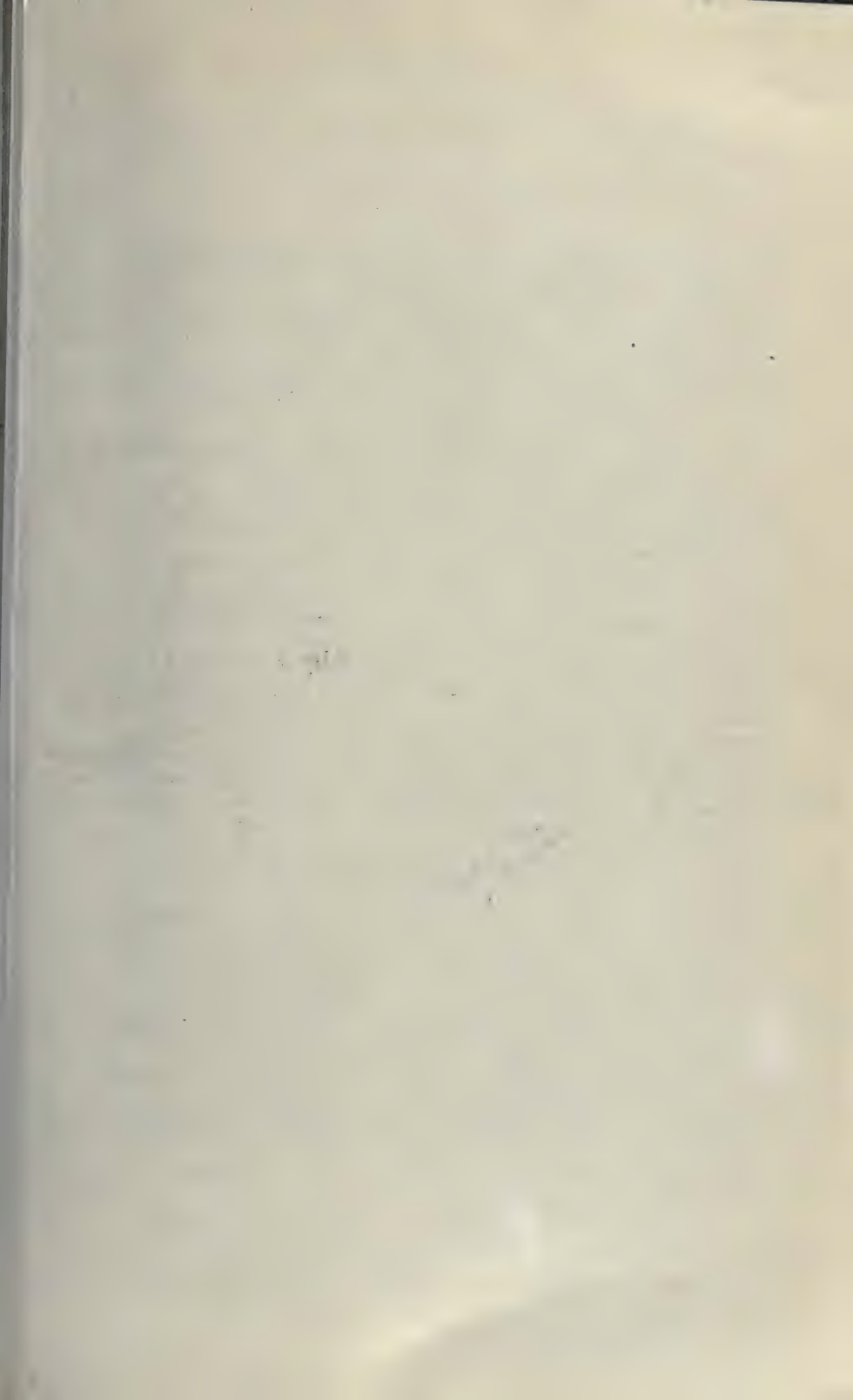
The department of naval architecture and shipbuilding offered 19 courses of lectures, including theory of shipbuilding, designing of war ships, boilers, machine construction, practical shipbuilding, classification of ships, etc.

The department of chemistry and metallurgy offered 51 courses, including chemistry (organic and inorganic), physical chemistry, electro-chemistry, technology of chemistry, crystallography, metallurgy, foundry work, cements, botany, chemistry of plants, foods, etc.

The department of general science offered 58 courses, including not only lectures on mathematics, physics, and kindred subjects, but also on literature, French, English, Italian, law, political science, and other general cultural studies.

ATTENDANCE.

The total attendance at the German technical high schools in 1903 was 14,626. Of this number 12,384 were Germans and 2,242 were foreigners. The large percentage of foreigners enrolled strikes one at once. These great technical institutions are virtually international. Their benefits stream out into many lands—lands which meet Germany under protection of her own educational armor. What wonder that a strong and growing public opinion condemns the admission of foreigners to the institutions? It is reported, and the writer believes erroneously, that this feeling is directed particularly against the United States, though the United States is by no means the leading participant in the technical education offered in Germany. In the foremost rank among those nations which dispatch students to Germany stands Russia. In an earlier paper it has already been shown that the commercial high school of Leipzig alone is attended by 101 Russian students. In a similarly preponderant degree they have found their way into the technical high schools. In 1902 but 58 American students were enrolled in the technical high schools, while 353 attended the German universities.





TECHNICAL HIGH SCHOOL, STUTTGART, GERMANY.

The largest attendance is registered at the celebrated technical high school of Charlottenburg (Berlin), where 3,089 regular students were enrolled in 1903, while 3,904 more attended merely as Hörer, who hear lectures on choice, without the privilege of graduating from the school. The attendance at the other eight schools ranges from 500 to 2,000, Munich, Darmstadt, Hanover, and Karlsruhe following one another in numerical strength.

The average age of the students on their entrance into the technical high schools is from 18 to 19 years. Counting one year of military service—for it will be remembered that students of this standing all possess the privilege of one year of military service as a volunteer—they have attained the age of 24 or 25 on graduation. At this age the mind has acquired ripeness, sobriety, and conservatism—all cardinal virtues for the successful entry in a career that lies in the highest strata of the technical world. The graduates of these schools are found everywhere in prominent positions. It is they who built up one of the greatest industries of the Empire—the chemical industry. In like manner they are breaking the way in other industries, and sending commodities “made in Germany” into all quarters of the globe. The real influence of these schools is today just beginning to be felt. It takes some time to build up industries on the lasting foundation of education. Today the structures are but just going up. The morrow will tell the story of overwhelming success—a success that springs from power, a power that rests on knowledge.

18. ADMINISTRATION OF INDUSTRIAL SCHOOLS.

CONTROLLING AGENCIES.

The administration of the German industrial schools, as of the system of general education, does not rest with the Government at Berlin, but has since the earliest days of the Empire been conducted by the various kingdoms and principalities. While this system of administration is conducive to rivalry and competition between the various members of the Empire in the establishment and promotion of schools, it probably has not yielded the results that a unified and centralized control and supervision might have achieved. Under this system there is no opportunity for a general and systematic application of the educational resources of the entire Empire for the advancement of professional, trade, and technical education, the need of which is common and of equal importance to all parts of the country. A lack of uniformity among institutions which should and do cooperate for a common end—the upbuilding of German commerce and industry—is always a disadvantage.

This fact was early recognized, and efforts were made to overcome it. The various governments have striven to create analogous systems, and to-day these efforts, aided by other influences, have been so well rewarded that a very closely united system of schools has developed. Greatest among these outside influences which made for the similar development of the industrial schools must be mentioned the three great German associations for the promotion of industrial education, namely, the association of German industrial schoolmen (*Verband deutscher Gewerbeschulmänner*); the German association for higher education (*Deutscher Verein für das Fortbildungsschulwesen*), and the German association for commercial education (*Deutscher Verband für das kaufmännische Unterrichtswesen*). These three organizations have a large membership spread over the entire Empire. Their publications are sent out to all parts of the land and they assemble from year to year in different cities of the Empire. Their members stream together from north, east, south, and west, to exchange ideas, compare experiences, criticise, suggest, and resolve.

These strong unifying influences have counteracted the effects of a decentralized administration and have given to the whole system of industrial schools a general aim and, to a large extent also, a general complexion. The division into lower, higher, and high schools is practically the same everywhere. The secondary schools of Saxony, Bavaria, Baden, or Württemberg are parallel to those of Prussia. Their general aims, their educational rank, and their curriculums are about the same. Their terminology is similar, which greatly facilitates discussion and reform in educational matters. Under a system of mutual accrediting students of schools in one member of the Empire are admitted to equivalent schools in other members. It is today only in special details that a local and dissimilar development is apparent and,

with reason, deplored. However, the educators of the Fatherland seem to have come, at the time of the unification of the German Empire, to the conclusion that whatever the advantages of a completely centralized control, they were more than neutralized by the greater advantages of a local administration. Hence, the wishes of the different governments were respected and the educational systems were permitted to remain in their hands.

The administration of the industrial schools by the various kingdoms and principalities offers peculiar difficulties because of the varied interests which these schools serve. There must be considered the requirements of commerce and industry, the demands of general education and art, and the needs of all those Government bureaus which employ men trained for their various services in specified industrial schools. These interests are in the hands of different authorities, as the minister of commerce and industry, the minister of interior, and the minister for educational affairs. The question hence arises, In which of these authorities shall be vested a general control and supervision of the industrial schools?

No complete uniformity exists at the present time in the solution of this problem, though in spite of a difference in the names of authorities in the various members of the Empire, at bottom a uniform tendency can be discerned. In Prussia the industrial schools have, since 1884, been subject to the minister of commerce and industry. In Saxony they are under the minister of the interior. In Bavaria they are, in general, subject to the minister of the interior for church and educational affairs, though industrial museums, industrial expositions, etc., are under the minister of the interior. In Baden they are subject to the minister of justice, religion, and education, though directly controlled by an industrial school council (*Gewerbeschulrat*). In Württemberg various ministers participate in the supervision of the industrial schools.

PRUSSIA.

The history of industrial education in Prussia is instructive in throwing light upon the problem of administration. Up to 1878 the minister of commerce, industry, and public works had control over all institutions for technical education except the general industrial continuation schools, the provincial schools of art and building, the private unsubsidized industrial schools, the drawing academy of Hanau, and all the industrial preparatory schools of the trade schools. The institutions enumerated remained in charge of the minister of religion and educational affairs.

In 1878, when a special ministry of commerce and industry was established, all industrial schools, with the exception of the schools of navigation, which remained under the minister of commerce and industry, were transferred to the minister for spiritual, educational, and sanitary affairs. This change was made in the belief that a unified control of all educational institutions was advantageous.

But six years later, in 1884, all the industrial schools, including the industrial continuation schools, were placed under the control of the minister of commerce and industry. This was done in recognition of the fact that the greatest problem in the development of a successful system of industrial schools was not so much their proper organization from a purely educational point of view as their wise adaptation to the

local and national needs of commerce and industry, an adaptation which could be intelligently and effectively consummated only by that ministry which supervised the commercial and industrial interests of the country. Primary in importance is the determination of the aims of an industrial school. These having been clearly set forth, the work of its organization and the introduction of educational methods for the attainment of these aims can be logically undertaken.

No further change was made in the administration of the Prussian industrial schools until 1895, when the agricultural continuation schools were transferred to the minister of agriculture, domains, and forestry. The growth in importance of the administrative duties pertaining to the industrial schools is well shown by the fact that whereas in 1884 one adviser (*vortragender Rat*) executed these official duties, three advisers and four technical assistants are required today. In addition to this the central technical bureau for the textile industry (*Technische Zentralstelle für Textil-Industrie*) performs practically all the general administrative work relating to the textile schools of the Empire. So rapidly did the task of administration grow (which is but another way of expressing the marvelous development of technical education) that it was also found advisable to further unburden the minister of commerce and industry by transferring a share of the more local administrative work to the various Prussian provincial presidents (*Regierungs-Präsidenten*). These direct representatives of the Government were provided with special technical assistants (*Regierungs und Gewerbeschulräte*), who conducted this work under the authority of the provincial presidents. At present there are ten such provincial industrial advisers, and the increase of this number is already planned, so that every Prussian province will soon have its own local industrial school advisers.

The minister of commerce and industry is also greatly assisted by the permanent commission for technical education, an advisory body existing since 1879, and composed of prominent members of the commercial and industrial class, directors of trade schools, and members of the *Landtag* who are interested in industrial education. The commission is convened from time to time at the call of the Prussian minister. It met in 1881, 1883, 1891, and 1896. Its sessions are attended by commissioners representing the minister of education and religion and the minister of public works. These conferences, though few and far between, have, in that systematic and thorough manner which is characteristic of all that the German undertakes, performed valuable service for industrial education.

BADEN.

In Baden the administration of the industrial schools has since 1893 been vested in the industrial school council (*Gewerbeschulrat*), which is subject to the minister of justice, religion, and education. However, a member of the ministry of the interior—the adviser on industrial matters—acts as presiding officer of the *Gewerbeschulrat*. The two ministers are thus enabled to cooperate, one speaking chiefly for the educational method and the other chiefly for the aims of the industrial schools. When important questions of organization, of curriculums, or of the inspection of institutions are brought before the *Gewerbeschulrat*, this body is empowered to add special members to

its council as extraordinary advisers. Industrial school inspectors, whose duty it is to make annual or more frequent tours of inspection to all industrial schools, act under the direction of the Gewerbeschulrat.

SAXONY.

In Saxony the industrial schools are subject to the minister of interior. The schools for hand lace making have since 1858 been supervised by special inspectors. All other technical and industrial schools are regularly inspected by an industrial school inspector (Gewerbeschul-Inspector). To relieve this official from some of his duties provision was made in 1894 whereby large trade schools with day courses, which enjoy a liberal State subsidy, are placed under the supervision and inspection of specified professors of the royal technical academies at Chemnitz. The schools for builders are inspected by a higher Saxon official of the building bureau.

WÜRTTEMBERG.

In Württemberg the administration of the industrial schools rests with various organs. The minister of interior controls the textile schools and the schools for fine mechanics and the minister for church and educational affairs controls the schools for builders, the schools for industrial art, and the industrial continuation schools. The minister of interior is aided by a subordinate body, the central commission for commerce and industry of Stuttgart. This commission is composed of certain government officials—members of the department of the interior, royally appointed members, industrial school inspectors—and a number of special advisers chosen by the chambers of commerce of Württemberg and by the boards of trade. The chamber of commerce of Stuttgart chooses two advisers and the other chambers and boards one each.

BAVARIA.

All the industrial continuation schools and the trade schools of Bavaria are subject to the minister of interior for church and educational affairs, while the industrial museums, the industrial expositions, the special masters' courses, etc., are controlled by the minister of the interior. The immediate inspection of the industrial continuation schools is in the hands of the rectors of the "real" schools and the circle school inspectors, while the special trade schools are inspected by teachers of the technical high schools and certain other high schools.

SUMMARY.

The experience of Germany in the administration of her industrial schools goes to show that the subordination of the system of industrial education to the same administrative body which controls the system of general education is unwise. It also goes to show, on the other hand, that the total withdrawal of the industrial schools from the influence of the administrators of the schools for general education is likewise detrimental to their most efficient development. As will be at once recognized, this is due to the fact that industrial schools have two sides to their constitution—an educational and an industrial side.

Proper educational methods must be employed and the educational needs of industry must be wisely judged. One requires knowledge of educational method, the other of industrial aims and requirements. A wise administration has hence been found to involve the participation and cooperation of two administrative departments—that which has charge of educational affairs and that which has charge of industrial affairs. As was seen, such cooperation, though expressed in various forms, is practically universal in Germany, that department in which is vested the administration of commercial and industrial affairs almost invariably exercising a predominant control, while the educational interests of the industrial schools are generally safeguarded by advisors, councils, commissions, and other bodies well informed on modern educational method.

19. SUMMARY.

NATIONAL CHARACTER OF GERMAN EDUCATION.

In Germany education gives prestige. The man of learning is honored and respected, and he moves in the highest circles. The people are marvelously well informed on educational issues and conditions, and are alive to all the important educational problems. They are not permitted to forget the needs of progress and change. Public discussions on educational subjects take place every day. Nor are these superficial or bombastic. The German is fond of details, he loves to get at the bottom of a matter, and so in education he glories in delving deep among the details of the problem. He brings before the public eye a constant stream of educational literature, prepared with great care and presented with inimitable logic and precision. He constructs a type of school which seems best adapted to convey a given quality of education. He formulates its aims in detail and brings the result of his patient research and thought before the bar of public opinion for approval or rejection. Thus it is that German educational progress is national progress. It is the result of national impulse and understanding, and hence embodies both permanence and constant growth.

ORGANIZATION AND NOMENCLATURE OF SCHOOLS.

"In its completeness and carefulness the school system of Germany is such as to excite the foreigner's admiration," said Matthew Arnold in 1886. What would he say to-day? The last thirty years have seen revolutionary changes in the German educational system. The organization of the schools has improved, their cooperation has become more complete. The industrial schools illustrate this quite as well as the general educational institutions, though, because of their later development, they still lack in slight degree the admirable system and uniformity of the general schools.

The organization of the industrial schools has proceeded on a distinctly scientific basis. The nomenclature is accurate. This is a tremendous advantage in educational reform and a great aid to educational progress. Everybody knows just what is meant when a writer speaks of an industrial continuation school (*gewerbliche Fortbildungsschule*), a "higher" trade school (*höhere Gewerbeschule*), or a "higher" institute of technology (*höhere Technikum*), a commercial "high" school (*Handelshochschule*); or when he designates a certain class as the "Tertia," "Ober-sekunda," or "Unter-sekunda." Every class has its own special name, which is uniform in all the schools, and which determines its relative position in the course of study of the school. Every grade of school likewise has its own name, which at once tells the reader what its general entrance requirements, its curriculum, and its aims must be. The universally established and scien-

tific terminology gives the German educator and critic ready and unmistakable means of expression. He can place his finger on the spot and say: "Here, in my estimation, lies the trouble which we must seek to remove," and everybody will understand just what he refers to. This certainty removes all danger of a waste of energy and time in misunderstood discussions, false criticisms, misapprehensions, and a general useless and wasteful cross-line fire between educational reformers.

PRIVATE INITIATIVE AND STATE AID.

It was quite uniformly true that in the establishment of industrial schools private initiative took the lead. The State generally held back until the private schools had proved their usefulness. Then followed a State subsidy and a general supervisory power, and finally most of the industrial schools of higher rank passed over entirely into the hands of the State. The German deserves great credit for his enterprise and discerning powers in the field of industrial education. Many important trade and commercial schools of to-day were, at the time of their establishment by private individuals, attacked as wild fantasies. Not infrequently State aid was refused, and the individual was compelled to make the best of his own educational views until time vindicated his course. It is not too much to say that to private enterprise probably belongs the greatest credit in the development of Germany's unrivaled system of industrial schools. It was the chambers of commerce, the commercial organizations, the special trade organizations, the guilds, public-spirited benefactors, and men of wide educational discerning powers that contributed most in the construction of the splendid system of industrial schools.

Nor can this reasonably be interpreted as a criticism against the attitude assumed by the State. Records show that this attitude from the first, though not aggressive, was not hostile or condemning, but highly favorable to the establishment of industrial schools. It was probably great wisdom on the part of the State to avoid criticism at a time when criticism against industrial schools was particularly severe, to hold back and let private enterprise prove the value and efficiency of the schools before extending its own powerful aid and protection. To-day every government in the Empire is intensely interested in the welfare of the industrial schools. The time of experimentation as to their value is past. It is now a question of how most economically, most efficiently, and most rapidly to further develop these schools. Though private initiative in the early days broke the way, the State is to-day not delinquent in following out the advantages of early private experience.

The various governments exercise a powerful influence over the organization and work of the industrial schools and the dispensation of their subsidies. The allowance of a subsidy is generally conditioned upon the meeting of certain requirements in organization, entrance requirements, curriculum, and grade of work. Schools which conform to the stipulated requirements enjoy financial aid, while others are assured of like aid as soon as the demands of the State are met. By this means it has been possible to introduce great uniformity into the numerous private institutions. The adopted standards are maintained and enforced by the State through an efficient system of inspection. Lagging institutions are threatened with the withdrawal of their sub-

sides, while efficient work receives recommendation. The public is kept informed of the entrance requirements, work, aims, and discipline of the schools through the systematic publication of complete catalogues. Every industrial school, from the lowest trade school to the technical high schools, annually issues its courses of study, entrance requirements, tuition fees, final examination regulations, disciplinary codes, and all other matter of interest and importance to those who contemplate sending their sons or daughters to a trade school. Where a strict discipline is maintained, and no academic freedom permitted, as in all the lower trade schools, the catalogues invariably contain all the school statutes regulating the conduct of students in attendance. Special notice is given to parents that by sending their son to the school they imply an agreement to abide by the disciplinary code of the institution which, while not over severe, is generally quite rigorous and keeps the young student within strict bounds of life.

FOREIGN STUDENTS IN GERMAN SCHOOLS.

At different points in these papers statistics have been presented to show how largely students from other countries participate in the industrial instruction of Germany. Some of the technical and commercial high schools are virtually international institutions dispensing knowledge to students of all countries. Out of 519 students who attended the commercial high school of Leipzig in 1902-3, 213 were foreigners (110 of these Russians). Another striking illustration is found in the tanning school of Freiberg, Saxony, where 42 out of 76 students enrolled in 1902-3 were foreigners. In 1903 the ten technical high schools had an enrollment of 2,242 foreigners, out of a total attendance of 14,426.

These hundreds of foreigners return to their various countries and there give no mean aid in the development of industries which are in direct competition with those of Germany. German steel thus meets German steel. German armor, put on in Germany, turns to meet German armor. On the basis of self-protection and national defense the Empire can not be criticised for wishing to close its industrial institutions to the rest of the world. Sentiment in favor of such a move on the part of the Government is reported to be rapidly growing. In some parts the agitation has become a clamor. What results this propaganda may attain in the course of the next few years challenges any attempt at prediction.

The absence of that "splendid isolation" which is the boast of England, and is even more apropos when applied to the United States, is one of the unfortunate hindrances which mar German development. Whatever its advantages, its disadvantages, both political and industrial, are obvious. For all European nations it is but a step into Germany, and once there the student can carry away his fill of the most advanced technical knowledge of the day. That 2,242 foreign technical students can absorb much valuable information requires no calculation to verify. Russia probably profits most in this international educational game. Her students are found in institutions everywhere. Through personal contact with some of these the writer was surprised to note their broad intelligence, their mental keenness, and their linguistic accomplishments. Many of these men speak four or five languages with ease.

MILITARY PRIVILEGE.

One can hardly pick up a German educational treatise without running across the military expression, "Certificate for one year of military service as a volunteer" (*Zeugniß zum einjährig-freiwilligen Militär-Dienst*), which, to the uninitiated, is absolutely without meaning as a designation of a certain intellectual attainment. This expression is the key to a most interesting and important relation between the German military and educational system. The certificate, which entitles its possessor to the privilege of but one year of military service instead of two or three, is the most important and most practical measure of intellectual attainment known in Germany. Its value and real merit lie in its definiteness. It represents a certain amount of schooling, a certain mental ripeness, a certain knowledge. Everybody knows just what it represents and uses the expression as he would the name of a coin or a measuring rod. The certificate is granted only after the successful completion of an examination open to all German lads who have finished six years of work in a secondary school. This examination is conducted in the school itself, on the normal and entire course of school work, by a joint examining commission of teachers in the school and Government inspectors. The State hence determines this standard of general education, thereby giving it both uniformity and universality.

The possession of this certificate is a great advantage to the German lad. It will be remembered that numerous secondary trade schools require such a certificate for admission to the school. In business also the young man with the certificate is sought, as frequent advertisements demonstrate. The German business man knows exactly what he gets when he advertises "for a boy possessing the certificate for one year of military service as a volunteer." He knows that his boy will have had six years of thorough general education as a foundation for a business career. He need not rely upon generalities in advertising for a "well-educated" young man.

From a military point of view the possession of such a certificate is also of great advantage, in that under the existing military regulations all German youths, as is well known, must perform military service for two or three years, excepting only those who have completed six years of work in some secondary school and have thus become "*Freiwilliger*," with the privilege of but one year of service as volunteers, and the further great privilege of becoming "*lieutenants of the reserves*" (*Leutnant in der Reserve*), if, after completing the one year of service with credit, they also pass a military examination.

It is only natural that all parents prefer to have their sons serving as lieutenants in case of war instead of as common soldiers, and the consequence is that all who can afford it, and even many who have to endure privations in order to be able to do so, are sending their sons to higher (secondary) schools so that they may be entitled to serve as "*Freiwilliger*," and become "*Leutnant in der Reserve*." This is of great significance from the point of view of industrial efficiency, for the consequence is that many thousands of young men, who, if this institution did not exist, would be sent by their parents to the workshop to earn money, are attending these higher schools. This military regulation exercises a most beneficent influence upon the

educational attainments of the German nation, and in a far-reaching manner helps to shape the destiny of the German Empire.

INFLUENCE OF THE GERMAN EMPEROR.

The German Emperor has given his enthusiasm and favor for the development of schools which disseminate a broad and practical knowledge in preparation for the actual needs of life, as well as offering a cultural education. The Emperor revealed his ideas in a noteworthy speech delivered before the Berlin Conference of Secondary Education, held in 1890, in which he made a plea for the further promotion of the scientific schools, with their broad, practical, modern curriculums, instead of the classical secondary schools with their Greek and Latin. He spoke in part as follows:

The course of training in our schools is defective in many ways. The chief reason is that since the year 1870 the classical philologists have been lodged in the Gymnasium as *beati possidentes*, and have laid the chief emphasis on the subject-matter of instruction—on learning and knowing—not on the formation of character and on the actual needs of life. * * * The demands made in the examinations show that less stress is laid on practical ability than on knowledge. The underlying principle of this is that the scholar must, above all things, know as much as possible; whether that knowledge fits the actual needs of after life is a secondary consideration. If one talks with one of these gentlemen, and tries to explain to him that the youth must in some measure be practically equipped at school for actual life and its problems, the invariable reply is that such is not the mission of the school, that its chief concern is the training of the mind (*die Gymnastik des Geistes*), and that, if this training of the mind is rightly ordered, the young man is placed in a position by means of it to undertake all the necessary tasks of life. I think that we can not go on acting from that point of view any longer. * * * I am well aware that in many circles I am regarded as a fanatical enemy of the older classical education, and that my views are oft quoted in support of other forms of school training. But this is a mistake. Anyone who has been at a Gymnasium, and has seen behind the scenes, knows where the defect is. The chief defect in these schools is the lack of a national basis for the instruction.

As the foundation of the studies of the Gymnasium we must take the mother tongue. We ought to train up young Germans with a national spirit, not as Greeks or Romans. We must depart from the basis which has been the tradition of centuries, from the monastic schools of the Middle Ages, where Latin was the chief thing, with a little Greek in addition. * * * Similarly, I should like to see the national ideal more inculcated in questions of history, geography, and legend. * * * Why are our young people misled? Why do so many people make their appearance with confused, unthought-out schemes for the improvement of the world? Because our young people do not know how the present state of things has developed. * * * Coming to the actual occupation of our young people at school, it is absolutely necessary that we should reduce the number of hours of work. Our schools, and I speak more especially of the Gymnasium, have undertaken a task beyond human strength, and have, in my opinion, caused an overproduction of highly educated people—more than the nation can bear. The expression 'academic proletariat' (*das Abiturientenproletariat*), which we owe to Prince Bismarck, is a true one. The whole body of so-called 'Hungerkandidaten' (especially those gentlemen who write for the press), are a danger to us. * * * I will therefore approve the foundation of no more such schools in the future unless their necessity can be proved. We have enough of them already.

The same monarch a few years ago issued the watchword, "The future of the German Empire lies on the seas." It had a force similar to Bismarck's famous declaration that "The nation that has the schools has the future." Commerce and industry were the great hope then; and commerce and industry remain the ambition today. Education was chosen as the powerful weapon with which to attain this future. Today this weapon is but just making itself felt. The industrial schools are still young. In the future more will be heard from the

young merchants and manufacturers who daily go out from these institutions. The greatest danger of Germany to the world is probably not in war, but in peace. Her energy is turned to conquests in the industrial world. Her marvelous development is industrial, not political. It is peaceful and spontaneous, and springs from national impulse. Such a development may well be respected and feared. And if we would better arm ourselves against industrial encroachments and equip ourselves for a continuance of our present encouraging commercial expansion with the most effective weapons, we would do well to take the example and lesson of Germany to heart by looking seriously and long to our own industrial schools, good though they are, and improving and developing these in the light of American conditions and of foreign experience.

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By far the most important and most fruitful sources of information upon which the preceding papers on industrial education in Germany were based were the school statutes, catalogues, annual reports, memorials, and jubilee publications supplied directly by the schools. These sources were found both comprehensive and accurate, for every school issues statements of its courses, studies, fees, entrance requirements, finances, statutes of organization or constitutions, disciplinary codes, etc.

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ERNST C. MEYER, *Deputy Consul.*

CHEMNITZ, GERMANY, 1903 and 1904.

INDUSTRIAL CONDITIONS IN GERMANY.

INTRODUCTION.

The following is the first of a series of articles on the industrial, commercial, and educational conditions in the German Empire, which appeared in the London Times in the fall of 1903. These articles have been reprinted in the Daily Consular Reports from time to time.

The subjects dealt with in this series of articles should be as interesting to Americans as they were and are to Englishmen.

The phenomenal success of Germany in its financial dealings with the outside world, its growth from an agricultural to a great industrial and commercial State in a single generation, can not fail to impress us, as it has impressed others. As we extend our export trade, the men we meet and the wares with which we have to compete are German. While England is feeling the force of the German Empire's facilities in securing trade at present, we are not to be exempted. No competitor with whom we will have to deal is so well prepared for success in the world's markets as is Germany.

Just what the German system is, how and from what it has grown, its purport and aims, and the methods by which German merchants and manufacturers hope to reach the world's markets, are set forth in this series of communications to the Times.

The entire series was transmitted to the Department by Consuls Swalm, of Southampton, and Halstead, of Birmingham, England.

The following, prefacing the first of the series, is a leader from the Times, which is self-explanatory:

Thirty-three years have elapsed since modern Germany emerged decisively triumphant from the ordeal of war on the battlefield of Sedan and took her place definitely among the great powers of the world. Vast as have been the political consequences of the German victories of 1870, it may be doubted whether the economic transformation of the new German Empire from a mainly agricultural into a great industrial and commercial state will not transcend them in importance, though it may readily be conceded that without the former the latter would hardly have been possible, or at least so easy of accomplishment. Within little more than three decades Germany, whose trade and industry we were then apt to regard as negligible quantities, has not only become the chief European competitor of this country in the trade of the world, but in some directions has actually surpassed it. Let the explanation of this remarkable fact be what it may—a more intelligent fiscal system, or the greater strenuousness of the people, or more thorough technical education and a more intelligent application of scientific methods—it is a fact which we can not ignore and of which we ought not to underrate the importance. To take only one instance, the exports of British produce amounted already in 1872 to 207 millions sterling [\$1,250,690,500], and last year they had risen only to 283 millions [\$1,577,219,500]. German exports, on the other hand, which in 1872 amounted to only 116 millions [\$564,514,000], have more than doubled within the same thirty years, and rose in 1902 to 241 millions [\$1,172,826,500]. These are significant figures, and, if we are to appreciate their importance and take to heart the lesson they unquestionably convey, it is essential that we should study the conditions under which such results have been achieved. With this purpose in view, we publish this morning

the first of a series of articles designed to illustrate the industrial conditions of Germany, and to call attention to the chief points in which they resemble or differ from those of this country and of our other great competitor, the United States of America.

The review of our correspondent will include not only descriptions of the great industrial centers and of the special facilities for which they may be indebted to circumstances or to position, but also the conditions under which work is carried on, the rate of remuneration of the workers, the effects of combinations, the provision made for housing and for education, and the degree of general comfort and prosperity which attends upon successful labor. At this period of the world's history the competition which necessarily exists in every country between one manufacturer and another exists in a form at least equally acute between the manufacturers of different countries; and these, again, are liable to be seriously handicapped in the industrial race by want of complete knowledge of the circumstances which either hinder or assist their rivals. Among these a very prominent place must be given to the aptitudes, dispositions, and habitual practices of workmen; and it is probable that, in other countries as well as in our own, workmen have not unfrequently been beguiled by ignorant leaders into insistence upon terms which could not be granted without serious injury to the business in which they were employed.

Whether this be so or not, it is certain that nothing but good can come of a more accurate knowledge of the conditions of foreign industries than now commonly obtains among ourselves; and it is not to be supposed either that we have nothing to learn from Germany or that Germany has nothing to learn from us. In the latter direction, however, there can be no doubt that our friendly rivals have not been idle, or that the large contingent of young Germans who annually seek employment in this country have ever failed to carry back whatever intelligence of our methods or our defects, of our strength or of our weakness, might appear to them to be calculated to conduce to the enlightenment of the German manufacturer or to the earlier introduction of his wares into markets in which our own had prevailed. Bodies of German artisans, moreover, have at one time and another visited this country in search of information; and although, if we remember aright, the last party of visitors of this kind appeared, to judge from their public declarations, to be chiefly impressed by the "unmanliness" of English workingmen, as displayed by their readiness to carry their children instead of compelling their wives to do so, it may, nevertheless, be surmised that they noticed other things as well, and would be duly communicative concerning them at the proper time and to the proper persons.

The descriptions of the great German centers of industry, which begin to-day with the Rhine province and Düsseldorf, will be extended to cover Essen, Elberfeld, Crefeld, Solingen, Saxony, and Chemnitz, and will be followed by more general articles on the conditions of factory and home life and on the cost of living in the various districts which have been passed under review. We hope in this way to be able to place before our readers a systematic picture of the commercial rival whose activity is next only to that of America, and in some respects is even more strenuous in its endeavors to seize upon whatever portion of the world's work it may be able to secure; and it is, of course, possible that our correspondent may have to describe circumstances which tend greatly to the advantage of our antagonists. It is not possible, however, that the advantages should be all in one direction, or that there should not be opportunities of success open to all those who will be at the pains to grasp them firmly and to use them rightly. But we are warned in the very first article in the description of the industries of Düsseldorf that, as far at least as these are concerned, the phrase "made in Germany" must no longer be employed as a term of reproach or as an equivalent for what was once understood to be the meaning of "brummagem," a word which, in a slightly modified spelling, we once found in an English-German dictionary published at Leipzig, with the interpretations "schlechte Geld, Kupfer-geld."

Our correspondent tells us that the steel working at Düsseldorf is at least good enough to find large buyers in this country, and that a single firm there had just received an order from England for £9,000 [\$43,799] worth of goods in one morning. Free traders of the old school would, we presume, be content with this arrangement, which would obviously leave little to be desired if our own factories were full of work and if the people at Düsseldorf possessed facilities which enabled them to turn out the goods in question better and more cheaply than could be done at home. Unless both these conditions are fulfilled, the facts are of a less satisfactory character, and they even seem, when taken together with others of like kind, fully to justify that demand for inquiry which some of our most active competitors describe as not only superfluous but dangerous, and which the scattered fragments of the once great Liberal party are untiring in their patriotic efforts to hinder or to prevent.

I. THE RHINE PROVINCE AND DÜSSELDORF.

The aim of these articles will be to give an account, as full as the limits of space will permit, of the main conditions of life in some of the chief manufacturing centers of Germany. They do not attempt anything like a full and detailed examination of that large, busy, and varied country. Such a task would occupy a lifetime, or many lifetimes, and fill a library. The reader is requested to bear the limitation in mind and to note that many of the conditions—such as wages and cost of living—vary considerably in different parts of the country.

The principal districts in which manufacturing industries are carried on lie in the Prussian provinces of the Rhineland, Westphalia, and Silesia, in all parts of Saxony, and in Alsace-Lorraine, Bavaria, and Württemberg. The most important of these, and the seats of the most formidable competition with England, are the Rhineland province of Prussia and the kingdom of Saxony. They may be likened roughly to Yorkshire and Lancashire, or, still more roughly, to Pennsylvania and Massachusetts. This inquiry is mainly confined to them. It has no pretensions to be exhaustive. In fact, a really exhaustive inquiry into industrial conditions, even in a single town, is wholly impracticable; such a pretension would be a make-believe. Nevertheless, it is possible to give a fairly comprehensive and yet accurate account which may perhaps present a truer picture than can be obtained from a more minute examination, wherein the details are apt to get out of focus and to blur the image. The plan here followed has been to take a number of representative towns, and to examine the conditions in a systematic way, largely by observation, supplemented by official reports and statistics. In presenting the results the aim is so to focus them as to give an insight into the conditions of life under which the great industrial development of Germany is proceeding, and to answer some of the questions which have recently arisen on that head. A number of selected towns will first be described in order to give a general idea of the environment in which the industrial population is placed, and to provide a setting of actuality for the separate subjects—factory conditions, home conditions, housing, pauperism, and so on—which follow. We naturally begin with Düsseldorf, the capital of the most prominent industrial district in Germany.

GENERAL FEATURES OF DÜSSELDORF.

* It is impossible to think of Düsseldorf without pleasure. We have no such industrial town in Great Britain, and still less have they anything of the sort in the United States, unless the few small factories which have sprung up in Washington entitle that agreeable little capital to be called an industrial town—a proposition that I can not admit. Indeed, I should say roundly that Düsseldorf can not be matched outside of Germany, if it were not for a few places such as Zürich and Geneva, which possess extraordinary natural advantages. Inside Germany it may be placed alongside of Hamburg, Dresden, and Stuttgart; but then the two latter are the capitals of kingdoms as well as manufacturing centers, while Hamburg—certainly the handsomest of all purely commercial towns—is a free city and a mighty port with more than 700,000 inhabitants. Düsseldorf, with its modest population of 214,000 (1900), really stands alone for utility and charm combined.

It is not, however, a purely manufacturing town like Elberfeld or Essen, which are the proper types for comparison with Yorkshire and Lancashire. It was once the capital of a principality, it still contains a royal residence, and is the seat of a provincial legislature; it has long been a center of art and a favorite residential town. Much of its charm is derived from a courtly past, but much also it owes to an industrial present, which has been grafted on to the ancient character, as in the case of Dresden and Nuremberg. To the one it owes its broad avenues, leafy gardens, ornamental waters, fine churches, art buildings, and general air of a little capital; to the other its well-built, well-kept business streets, its excellent shops, its cafés, theaters, electric trains, and handsome new railway station. All these are redolent of prosperity and a well-ordered civic life, and characteristic of modern urban Germany, of which Berlin is the archetype.

BERLIN.

Having mentioned the German capital, I will take the opportunity to say here parenthetically that, although it contains some notable manufacturing establishments, it is purposely omitted from my list of manufacturing towns, because that element plays but a small part in the general life, and so many other factors are present as to make it quite unrepresentative of industrial Germany. It is never safe to take the capital of a country as a trustworthy type, and to assume that all the rest resembles it. It nearly always represents the worst, because vice and crime gravitate to the capital, and in the larger aggregations of people the degraded find more companions to keep them in countenance. This is conspicuously the case with Berlin, which has become the chief pleasure town of Germany, and the great center for wealthy persons in search of amusement and dissipation, with all the crew of parasites who wait upon their pleasures. Consequently the old-fashioned German virtues, to which the country owes its strength, have little hold in Berlin; the moral tone is more lax, the standard of comfort and the cost of living are higher, and the birth rate is lower than in the genuine industrial communities. To some extent Berlin is also representative of the best in Germany, though less so than some other capitals—London and Paris, for example, in their respective countries. Berlin absorbs less of the intellectual life of the nation than they do, and it has no traditions, neither is it the seat of a strenuous commercial activity. But it does represent the most complete application of science, order, and method—preeminently German qualities—to public life. It is a marvel of civic administration, the most modern and the most perfectly organized city that there is. If one wanted to show some visitor from another sphere, or some distinguished revenant from the past, the most complete embodiment of modern ideas in the way of civilization, one must take him to Berlin.

The skyscraping buildings in American towns, though recently built, are not modern in spirit, but just the reverse; they are survivals from a crude and lawless, if adventurous, age which is passing away. In more civilized communities the height of the buildings is regulated in the public interest, and people are beginning to find the necessity of regulation in America. In Berlin it has reached its fullest expression. The limit is the width of the street, with a maximum of 72 feet, and since space is enormously valuable, all the buildings rise to the limit,

which gives about six stories. Then the width of the streets is similarly regulated, and since the whole town is new, with some small and disappearing exceptions, it is all the same. You may go in any direction for miles, right to the very edge of the city, where the buildings terminate abruptly in a field, and it is all the same—the same broad, clean, well-paved streets, the same tall and massive houses, the same fine shops, the same electric light, the same electric trams. It is not pretty, or picturesque, or charming, or interesting—far from it; there is too much uniformity for that, and one would almost welcome a few judiciously distributed slums as a relief; but it is preeminently modern and civilized, and German. At the same time this orderly exterior conceals a multitude of evils, of which overcrowding is one, for the housing question, acute in all German towns, is perhaps most acute in Berlin, where all the world, save ambassadors and such great folk, lives more or less huddled together in flats and tenements, or barracks, as the Germans correctly term them.

This digression is less irrelevant than it may seem, for in order to appreciate urban life in Germany one must know something of its ultimate expression in the capital. Orderliness is its chief quality, overcrowding its greatest defect; and all the towns which will be passed in review, though widely differing in many respects, possess these two features in a greater or less degree. Of them all, Düsseldorf is the most Berlinized, because an exceptionally large part of it is quite modern; and yet the differences are great. There is nothing pretentious or imposing about Düsseldorf; it does not swagger and strut and bustle; its aspect is tranquil and pleasant, its buildings rather low than high, its streets quiet though full of life. Flat life prevails, but there are many private houses. No town suffers less from monotony of style, and if it has no buildings of the highest architectural merit or interest, neither has it any of such supreme ugliness as the Reichstag and the new Dom in Berlin. But before going into further details I must say something about its situation and the industrial Rhine province of which it is the center.

THE RHINE PROVINCE.

The Rhineland is the most westerly province of Prussia. The total population is 5,760,000 (1900). Cologne is the commercial capital of the whole, but the two distinctively industrial districts are Aachen and Düsseldorf, of which the latter is by far the more important. It includes the lowest section of the Rhine lying within the German frontiers, and contains a whole plexus of manufacturing towns, which for the most part have a special character. The town of Düsseldorf lies in the center of the plexus, with Crefeld, Neuss, Rheydt, and München-Gladbach to the west, on the left bank of the river; Elberfeld, Barmen, Solingen, and Remscheid to the east; Duisburg, Ruhrort, Mülheim, Oberhausen, and Essen to the north. These towns and a number of other smaller places scattered among them are the homes of flourishing manufactures in great variety. Iron and steel works of different kinds are carried on principally in Düsseldorf, Essen, Duisburg, Oberhausen, and Ruhrort; Crefeld is the chief silk town; München-Gladbach is the headquarters of cotton; Elberfeld and Barmen manufacture chemicals and dyes, mixed textiles, buttons, braid, and

many other things; Solingen and Remscheid make cutlery, swords, saws, and files.

The concentration of so many industries in one district is due to different causes; but it may be said generally that the situation of old-established seats of industry, such as Elberfeld and Solingen, is most often determined by the presence of water, either for driving power or for chemical purposes; that of more modern ones by the proximity of mining regions or of transport facilities by rail or water. Thus the modern industrial evolution of the Rhineland, particularly in iron and steel manufactures, which have attained such a remarkable development, is probably due in the first instance to the coal mines of the province and of Westphalia, which adjoins it on the eastern side, and in the second to the great waterway of the Rhine and an excellent system of railroads. The extensive Rhine-Westphalian coal basin stretches eastward from the river, where the Ruhr joins it below Düsseldorf, for some 30 miles into Westphalia. Essen and its neighbors in the Ruhr Valley stand upon it, but the bulk of the mining district lies over the border in Westphalia. It is a hilly region, almost given up to coal and iron. One group of smoky furnaces and tall chimneys follows another—Bochum, Hagen, Herdecke, Hörde, Dortmund, and others—interspersed with coalpits and tidy mining villages. Yet it can not be called a “black country,” and in no wise resembles the desolation of South Staffordshire, for amid all the pits and furnaces the cheerful Westphalian farms, surrounded by trees and well-cultivated fields, smile prosperously from the hillside. This brief outline will give some idea of the situation of Düsseldorf and the character of its surroundings. Most of the places mentioned are within an hour’s ride or so; the most distant—Dortmund and, in the opposite direction, Aachen—can be easily visited in a day.

THE TOWN OF DÜSSELDORF.

The town itself lies on the right bank of the Rhine, upon level ground with a backing of low, wooded hills, which provide a popular resort and playground in summer. The river is here a magnificent stream, clear, swift running, over 300 yards wide and 40 feet deep; but, strangely enough, it is not a prominent feature in Düsseldorf life. There are some good quays, opened in 1896, but they are not on a large scale, and I never went down to the water without wondering at the meagerness of the traffic. That may, however, have been peculiar to the winter season. As for the inhabitants, no one goes near the river, though there is a fine promenade along the embankment. This has been recently constructed. Only two or three years ago, I am told, the riverside was a swamp, which perhaps explains why it still finds no favor, for these matters are governed by custom, which changes slowly. Whatever is the reason, Düsseldorf literally and ostentatiously turns its back upon the noble waterway that should be its pride. The oldest part of the town lies nearest the river, but only back windows or none at all look in that direction. In this quarter the streets are narrow and not guiltless of slums, but they are relieved by the old market place and a good many public buildings and offices, including the home of the Prussian district government and the Rathaus. Neither is worthy of the town. The Düsseldorf authorities have not yet built themselves a lordly palace, like the town hall at Elberfeld,

but have, much to their credit, spent the money on other public improvements, and have contented themselves with somewhat makeshift quarters which have neither the picturesqueness of the old nor the convenience of the new. The Kunst-Akademie, however, in the same part of the town, is a stately palace of art.

Next to this old quarter, with its narrow, irregular streets and poor population, comes a very different section, consisting of broad, straight boulevards terminating in the charming little park called the Jägerhof. This is the bit of Düsseldorf which never fails to strike every stranger, and it is indeed unique. I remember once reading a dissertation by some gentleman from Berlin on the width of streets, in which he proved to his own satisfaction that Unter den Linden is the widest street in the world. But he left out the Avenida at Lisbon, which is certainly both wider and longer and far prettier than the pride of Berlin, and I think he must have overlooked the Königs-Allee at Düsseldorf also. A stretch of ornamental water runs down the middle, and if one regards both sides as forming one whole, this remarkable street consists of two roadways and three foot pavements, all of ample width, a riding track, a double avenue of fine trees, and a piece of water 20 yards wide, spanned by numerous ornamental bridges. It is less pretentious than Unter den Linden, but incomparably more charming. Beyond this section and still farther from the river lies the chief mass of the town, which is of a more ordinary character, but very superior for a place of its size. It has spread rapidly in all directions in recent years, and now reaches to the outlying suburbs. Here in the outermost ring are the works and factories, and it is in a great measure their exceptionally retired position which makes Düsseldorf so very unlike most other manufacturing towns. Although they are chiefly iron and steel works equipped with foundries, the place seems guiltless of smoke, which is more than can be said even of Dresden, where the old Frauenkirche is soot-begrimed as black as St. Paul's. Among the more notable establishments are those of the Düsseldorf-Ratinger Tube Boiler Works, where the Dürr boilers are made; of Ernst Schiess, whose heavy machine tools are famous all over the world, and Messrs. Haniel and Lueg, who employ about 2,000 men and make all kinds of engines and machinery.

These firms, I regret to say, send a great deal more of their manufactures to England, and often to the very towns where the same things are made, than is at all flattering to us. I have seen heavy machine tools going to Glasgow and Barrow, hydraulic presses and steel ingots to Sheffield, crank shafts for electrical machinery to Manchester, shaft linings and a shaft borer to Kent, pumps to Middlesbrough, forgings for machinery to the Tyne, and many other things. And do not let anyone suppose that these things are "cheap and nasty." That phrase is absolutely out of date in regard to German products. The work is first rate, as every English manufacturer knows who visited the brilliantly successful Düsseldorf Exhibition in 1902. The verdict of one highly competent authority, who has visited every industrial exhibition for the last fifteen years, and knows the United States as well as England and other parts of Europe, will suffice. "It was," he said, "the finest show of machinery and tools ever seen." Nor is the export trade all "dumping" of surplus products. Haniel and Lueg are executing more orders for England than for Germany, although they only entered the English market two or three years ago. The day

before I visited the works they had received £9,000 [\$43,799] worth of orders from England in one morning. Besides the firms mentioned, there are many other well-appointed steel and engineering establishments, some large glass works, and a number of miscellaneous factories. Some are of quite recent foundation, and all have undergone rapid development within the last few years. From the notes published by Dr. Johannes Feig, of the city statistical office, I learn that the number of wage-earners in Düsseldorf rose from 18,761 in 1875 to 53,580 in 1895—that is to say, it was nearly tripled in twenty years, and the increase has since been equally or more rapid. At the same time the number of establishments in proportion to the persons employed has largely diminished. In other words, Düsseldorf has become a factory town, and the size of the factories is increasing.

The work people live for the most part at no great distance from their work in the outer ring of the town, or the suburbs. The rapid increase in their numbers has made housing a very difficult matter. Great efforts have been made to overcome it by building societies, the municipality, and employers, but with only limited success. The whole subject will be treated separately in its proper place, and can therefore be dismissed here with a brief reference. The working classes are housed in Düsseldorf, as in most German towns, almost entirely in flats. The cottage system is nearly as rare as the tenement system in English provincial towns; but in Düsseldorf the tenements are of moderate size, not more than four stories high, and in the best of them the rooms are convenient and of fair size. The rents, however, are very high. Even in those erected by the municipality the average weekly rent is nearly half a crown per room. The only provincial town in England in which I have found rents equally high is Newcastle. It follows that a great many families are compelled to live in two rooms, and so great is the demand that even those in receipt of good wages are often unable to find lodgings if they have many children.

Situated as it is, Düsseldorf is necessarily the center of a great railway traffic. It lies on the main line connecting Cologne with Essen, and so with Hamburg, Berlin, and North Germany at large; also on the main line from Cologne to Flushing, and so to London, distant only thirteen hours. In addition, it is the terminus for numerous branch lines to neighboring places on both sides of the Rhine, and so rapidly has the traffic developed that the very handsome central station, opened only about ten years ago, is already inadequate.

There are three subsidiary stations in the town. A network of electric tram lines further connects it with the neighboring towns. Some of them belong to private companies, but the excellent system in the city itself is worked by the municipality. Düsseldorf has no timidity about municipal enterprise. Among the concerns carried on are water supply, gas, electric light, electric trams, parks, markets, quays, slaughterhouse, savings banks, mortgage business, pawn shop, libraries, baths, theater, concert hall, orchestra, museums, picture gallery, police, fire brigade, workhouse, outdoor relief, night refuge, workmen's dwellings, sick insurance, numerous endowed charities, hospitals (general and lying-in), cemeteries, and elementary, secondary, and art schools. In addition to these, the town contributes to the support of an observatory and a labor intelligence office for the unemployed, sends invalid children to "holiday colonies," provides for a

certain number of orphans, and occasionally gives free breakfasts to poor school children in winter. And yet Düsseldorf is by no means a "socialist" town in the German sense, which goes to show what very different meanings are attached to that word. Its sanitary condition is not up to the highest standard, since the cesspool system still prevails, although the town is sewered. Nevertheless the public health is good and the death rate low. The place is very clean and free from smells; I have seen house drains discharging in the open only on the extreme outskirts; slummy streets are few and need some finding. In these respects Düsseldorf is markedly superior to most industrial towns in Germany or any other country.

Of the population, about three-fourths are Roman Catholic and one-fourth Protestant, with some 2,000 Jews. With regard to education, which will be more fully dealt with hereafter, only a few points need be noted. It must be remembered that denominational religious teaching is carefully secured by law in Germany, and, wherever possible, separate schools for the two confessions are provided. Consequently, of the 42 public elementary schools in Düsseldorf, 29 are Roman Catholic, 11 Evangelical, and only 2 (suburban) are mixed. Compulsory evening continuation schools for boys of 14 to 16 years of age have recently been established. There were, in 1902, 40 classes, carried on in 7 schools. The town possesses no "technical" school. The engineering and mining schools for the district are situated at Duisburg, Elberfeld, and Hagen, the textile schools at Crefeld, München-Gladbach, and Barmen. There is, however, a municipal art-trade school at Düsseldorf, with classes for drawing, painting, decorating, modeling, carving, engraving, cabinetmaking, glass painting, lithography, and other crafts. The number of students in the winter session of 1901-2 was 285.

The growth of the town since the formation of the German Empire is shown by the following census figures: 1871, 69,265; 1880, 95,458; 1890, 144,642; 1900, 213,711; 1902 (estimated), 225,984. It is the twelfth city in the Empire in point of population.

The following additional data are given:

Vital statistics.—Population, 217,500; births, per 1,000 living, 38.1; deaths per 1,000, 18.7; excess of births, 19.4; deaths under 1 year, per 1,000, 7.9; suicides per 1,000, 0.15. The illegitimate births were 6.9 per cent.

Finance.—Debt (1899-1900), £1,835,377 [\$8,931,863]; expenditure (1902), total, £569,450 [\$2,771,229]; per head, £2 13s. 3½d. [\$12.74]; Taxation, total, £328,000 [\$1,596,212]; per head, £1 10s. 8½d. [\$7.34].

Pauperism.—Expenditure, total, £47,300 [\$230,186]; per head of population, 4s. 5d. [\$1.06].

Miscellaneous.—Police force, 286; public houses, 542; churches, 41; theaters, 3; newspapers, 29; free libraries, 3.

2. ESSEN.

Essen and Krupp. Two great names, famous all the world over, and deserving of fame. As the big expresses roll into the station, which is the junction where the Berlin through trains divide for Flushing and Cologne, the name catches the eye, and many a traveler, hardly believing that this is the place of which he has heard so much, looks out of the window to get a glimpse of the great works; but few alight unless they have business to transact. In spite of its fame and its situation on one of the main highways of Europe, Essen is little known. "There is nothing to see except the works." Well, perhaps not; and the works are not open to everybody. Yet there is an interest in a town of this kind, with its strenuous, ordered, industrial life. It is real and human and healthy and the very heart of our age. For some minds it has more attraction than the catalogued joys of the Baedeker round, and is more worth study than the sores of a fashionable city slum. Perhaps the time will come when travelers in search of distraction will turn their attention to such places, and then the world of means and leisure will know how the other half lives a great deal better than it is ever likely to learn from selected exhibitions of morbid social excrescences displayed on a screen by professional reformers or realistic novelists.

Essen does not represent the most common type of industrial community; it is too much of a one-man town and bears too many marks of the paternal employer's hand. But as an industrial achievement it is all the more remarkable. In 1811, when the first smelting furnace for casting steel was set up by Peter Friedrich Krupp, the population of Essen was under 4,000. In 1901 it was 183,500, out of which the Krupp contingent numbered about 84,000. At the same date there were more workmen's dwellings built by the firm than there had been inhabitants when it was founded. Now, this and a great deal more is essentially the work of one man, and it is unparalleled in the history of industry. It must not be supposed, however, that the Krupp family created Essen out of the wilderness, as some places have been created by industrial enterprise. Nor did they—to put the matter in another familiar way—turn a sweet rural scene into a wilderness of bricks and chimneys. The place is ancient and has a history.

HISTORY OF ESSEN.

In the Middle Ages it was a walled city; the shape of the central quarter, the narrow and winding streets, and the names of the four gates survive as reminders of the past, but no other vestiges remain. It was for many centuries the seat of a princely religious foundation, dating from the ninth century. The town no doubt grew up as a dependency around the cloister, which had royal and imperial connections; and both were ruled by a long series of abbesses of exalted rank whose office from an early period carried with it the secular power and

the title of Fürstin, or reigning princess. The last Princess Abbess of Essen died in 1826, but she had been turned out five and twenty years before, on the conclusion of the peace of Lunéville, by which a number of church manors fell to Prussia. There is evidence that some time during this early period of the town's history the inhabitants carried on a considerable textile industry. The names Flax market, Weaver place, and Weaver street, which survive, attest its existence. For centuries also Essen was famous for the manufacture of firearms. The command of running water and of coal, which is mentioned in connection with Essen as early as 1317, accounts for the development of these industries. They appear, however, to have declined gradually during the eighteenth century, when the town fell into a decayed condition. Modern Essen may be said to date from the evacuation of the French in 1813, which almost coincides with the original foundation of the Krupp works and marks the beginning of a new era. At that time the city walls were still standing, and a truly dismal little place they inclosed. To quote Justus Grüner:

"All the deencies of life must here be renounced. Dirtier inns and ruder hosts are not to be met with in all Germany. Crooked, ill-paved lanes, old-fashioned, dilapidated houses, filth, crowding, and darkness attest the antiquity of the place. On account of the entire absence of street lighting, it is dangerous to take a walk in the evening, because one can not help running up against great stakes, which commonly stand right in the middle and at the sides of the roadway. There is no police of any kind."

From this unpromising germ modern Essen has been gradually evolved, and at first the process was slow. It was not until 1830 that the middens and pigsties which adorned the streets were cleared away.

I am not at all sure myself what "progress" is, but the word is much used by those who declaim against the "factory system," against capital, individual enterprise and ownership. These things, they tell us, are hostile to progress. Yet it can not be denied that a good many signs of what is called progress in their own vocabulary have accompanied the evolution of Essen from the squalid slum it was in the lamented ante-factory age, when the workman owned his own tools, to the iron city of today, with its good workmen's houses, its public schools, parks, libraries, baths, hospitals, cooperative stores, recreations, and what not. Nor can it be denied that the Krupp factory has had a large share in the evolution. Still less can it be denied that this factory with all its works is an example of individual enterprise and ownership. The story bears repeating.

THE KRUPP FAMILY.

Peter Friedrich Krupp must have been a sanguine and energetic young man. He was born in 1787 and went as a youth into some iron works at Sterkrade, which came into the possession of his grandmother in 1800. These works had been started in 1780 and were among the earliest in the district; they still give their name to the large iron and steel business known as the Gutehoffnungshütte of Oberhausen. Here young Krupp worked at the invention of a process for casting steel and committed the reprehensible imprudence of marrying at 21. One hears a good deal in these days about prudence, but in those a young man with some stuff in him followed the dictates of nature and took

his future in his hand. Friedrich did so and carried off his bride to Essen, where some iron works that had been built for the abbess in 1790 were at this time acquired by the firm, which also became the owners of the Sterkrade works. This connection may have been the reason of Krupp's settling in Essen, but at any rate he soon set up for himself, and at the age of 23 he purchased a small forge worked by water power, where he devoted his time to secret experiments in smelting steel in small crucibles. To this day the casting of crucible steel is the great specialty of the Essen works. A son, Alfred, was born to the young couple in 1812, when Friedrich Krupp was 25. Want of means compelled him to enter into partnership at this time, and in 1815 the firm announced that they were prepared to accept orders for cast steel; but as no orders came the partnership was dissolved and he was left to struggle on alone. This he did for some years, but with difficulty, until in 1826 he fell ill and died, leaving a widow and four children. Alfred, the eldest, was then 14, and on his shoulders fell the burden of carrying on the business. His father had intrusted the secret to him and taught him the trade—another reprehensible proceeding, according to modern views, which regard it as a crime for a child to enter a workshop or learn anything but school lessons before the age of 14. Alfred left school at once and took his place in the shop, where he worked at the furnace and the forge harder than his own handful of journeymen, and for years made no more than sufficed to pay their modest wages. "For my own toil and pains at such an early age," he said afterward, "I had no reward but the consciousness of doing my duty."

Few schoolboys have entered on the struggle for life with such a laborious inheritance and fewer have emerged so victoriously after so long a probation. For twenty-five years the fate of the concern hung in the balance, and success became assured only after the London Exhibition of 1851. Four years previously the first gun, a 3-pounder of cast steel, had been finished. Thenceforward the story is one of rapid and almost continual progress. In 1853 the manufacture of weldless steel tires was begun. Ten years later the first workman's colony was built, and not long after Mr. Krupp found himself in a position to obtain command of raw materials, and to place the business in a self-sufficing and impregnable position by the purchase of iron mines and blast furnaces, presently followed by coal mines. He died in 1887, having been for sixty years the head and for forty years the sole proprietor of the works, which then passed to his only son, the late Mr. Friedrich Alfred Krupp. They have been greatly extended since by the addition of other works and mines and, in 1902, the Germania shipbuilding yard at Kiel, but are still, with all their branches and appendages, the sole property of the family. They are managed by a board of directors. On April 1, 1902, the total number of persons employed at the various works was 43,083, representing, with their families, a population of about 150,000. The numbers were thus distributed:

Number of employees in Krupp works, April 1, 1902.

Steel works at Essen.....	24,536
Gruson works at Buckau.....	2,773
Shipbuilding yard at Kiel.....	3,987
Coal mines.....	6,159
Blast furnaces, proving ground, etc.....	5,628
Total.....	43,083

I do not think any apology is needed for spending a little time on this well-known story. In some details it is unique, but in broad outlines it is typical. The old-fashioned little house of five rooms in which Alfred Krupp's parents lived and worked and brought up their children, hard by the original forge, still stands at the entrance to the works, and a tablet on the door refers, modestly enough, to the privations, efforts, and anxieties which attended the founding of the business and overshadowed its career for many years. The contrast between the small, struggling beginning and the immense eventual achievement stands embodied before one's eyes with a dramatic significance which can not fail to impress; but if one inquires the origin of other manufacturing concerns one finds that with rare exceptions—and those of recent date—they were started in much the same manner, went through similar early struggles, and survived by virtue of the same qualities. The "factory system" is not the creation of capital, but of the superior intelligence, industry, and endurance of individual workmen, and it has been a great school for the exercise and development of those qualities. The denunciation of the "system" and all similar cries are, at bottom, demands that the naturally superior shall not be allowed to exercise the qualities implanted in him by nature, but shall be artificially reduced to the level of the inferior.

Not all successful manufacturers, however, have used their success in such a responsible fashion as Alfred Krupp and his successor. There are other model settlements in Germany and elsewhere. England invented them and can show as good specimens today as any other country. But there is none on so large a scale or perhaps so complete as Krupp's. It was in many respects a pioneer and has long served as a model. Consequently, it is the object of bitter resentment on the part of those theorists who maintain the right of the workman to the whole produce of labor. They denounce all such benevolent works as a fraudulent imposition on the recipient. Their theory is out of date, and their attacks are base, but in part they are right. The reign of the benevolent employer is over. He gets no thanks, and the tendency is all in the direction of securing such conditions of employment as will enable the employed to provide their own benevolent institutions. This will not, of course, satisfy the extremists, who want to have no employers or employed, but to merge both into the community. In fact, it is a blow to them and another nail in the coffin of orthodox social democracy, for it will tend to make the employed more content. More philosophical observers will regard it with equanimity as the next turn in the ever-moving social current, whose ceaseless change represents the fresh readjustment of men to ever-changing conditions and invariably confounds the theorists by taking an unexpected bend. At the same time they will pay a tribute of appreciation to those who have done good work in their day. Among them Alfred Krupp stands out as a man of mark. Only blind hatred can refuse to see in the institutions started by him and continued by his son for the welfare of their men a high sense of responsibility and a genuine fellow-feeling. Their value may be a matter of opinion; it depends on the object. But if material well-being be the measure of success—and in these days none other is recognized—the proofs of it are abundant.

The statues and portraits of Alfred Krupp which commemorate him at Essen give a very clear idea of what manner of man he was. Of the same generation as Kaiser Wilhelm I and Von Moltke, he was of

the same mold—tall, upright, and spare, an alert, strenuous man, with the head of an inventor, a penetrating yet kindly eye, and an air of command; a thinker, yet living amid realities and a master of them; an unmistakable leader of men. Add Bismarck, and you get a stately quartette, indeed. It may be mere accident, but I look in vain for men of this physical type in Germany to-day. They seem to belong to another and more heroic age.

THE TOWN.

The English town which most naturally suggests itself for comparison with Essen is Sheffield; and there are many points of resemblance between them. Both lie on the same hilly sort of ground that goes with the presence of coal; both have narrow, old-fashioned, irregular streets; both have charming country on their outskirts, though in this the advantage lies with Sheffield; and both manufacture the same things on the same scale. On the other hand, Sheffield is more than twice as big, it is a much older manufacturing place, and has a greater variety of manufactures. The ancient cutlery industry, file cutting, and electroplating give it a special character which is lacking to Essen. Take them as they stand, however, for what the comparison may be worth, and it must be admitted that the German has rather the best of it. The site of the Krupp works on the lower side of Essen, in and yet out of the town, is curiously like that of the great Sheffield works—Cammell's, Brown's, Firth's, and Vickers and Maxim's—which lie all together in a similar position, and probably occupy even more ground between them. They certainly make more smoke, or it hangs more persistently about. Sheffield is the grimest of all our manufacturing towns, with the possible exception of Gateshead, and a large part of it is generally wrapped in a pall which neither London nor Manchester can equal. America alone, with her genius for surpassing everything, easily beats it. Compared with the inferno of Pittsburg and the lesser, but still more grimy and squalid, hells up the Monongahela Valley—Homestead, Braddock, and the rest—Sheffield is clean and Essen a pleasure resort, in spite of the fifty or sixty tall Krupp chimneys that flank it on one side and various other factories, with sundry coalpits, on the other.

From the high ground to the south one gets a good bird's-eye view of the whole, and it is worth a look. The largest private workshop in the world lies below on the left, a self-contained unit in a ring fence, spread out over a great area on the flat ground; for the Krupps have not been cramped for space and there is no huddling. The smoke drifts away northward for miles, but leaves everything clear behind it. To the right lies the town with its spires and public buildings and a spacious park in the foreground. Around one are the Krupp colonies. These begin close to the works on the side away from the town and spread up the hills to the south and southwest, lying dotted about over a wide area and forming a number of separate villages. As an essential part of Essen they deserve some notice. There are eight of them, built at different times and in different styles. The oldest dates from 1863, and lies just outside the factory gates. It consists of a few rows of ordinary houses arranged in streets and occupied as flats of two and three rooms each. The next were built in order to accommodate the great increase in the number of hands caused by the rapid expansion of the business after the Franco-German war. Apart from some tem-

porary buildings run up in a hurry and since demolished they consist of an extension of the first colony and three new ones laid out as separate and self-contained villages with a more or less rural character. The houses are grouped about central open spaces; most of them have gardens and some have cow stalls. Schools, stores, market places, recreation grounds, and other public institutions, including the indispensable Bierhalle, make the village complete. But there are no fancy appointments about these colonies. Everything is quite plain and practical. The houses are not single cottages; they contain from four to twelve families, each occupying from two to four rooms. The object was to provide cheap and decent housing, which was not otherwise obtainable, and it is kept strictly in view.

The three remaining colonies were built many years later by Friedrich Alfred Krupp. They lie farther out in the country and are of a more ornamental character. In one—the most recent of all—the flat system is retained, but is carried out in a more artistic fashion. The other two consist of cottages in the English style and are quite charming, particularly the Altenhof colony for disabled, aged, and pensioned workmen. It lies high up on the hill at some distance from Essen, and includes two churches—Roman Catholic and Protestant—and a delightfully situated convalescent home. Here the old pensioners pass their remaining years in the greatest comfort, pottering in and out of each other's houses and discussing the newspaper or gossiping. The total number of dwellings erected at the end of 1901 was 4,274, thus classified: Two-room, 1,660; three-room, 1,869; four-room, 448; five-room, 150; six-room, 63; seven-room or larger, 54. The rents will be given under the head of housing. The capital expended on workmen's houses by the firm amounted at the same date to £814,000 [\$3,961,331]. Other subsidiary institutions include a general hospital, two infectious hospitals, medicinal baths, circulating library, dining rooms, clubhouses, schools, stores, savings banks, life insurance, and numerous sick and pension funds. The effect of the Krupp colonies in meeting the housing difficulty is seen in the fact that the average weekly rent of a single room in Essen is only (1901) 1s. 8d. [\$0.40], against 2s. to 2s. 6d. [\$0.48 to \$0.60] in neighboring towns of a similar character.

With regard to Essen proper not much more need be said from the industrial point of view. There is nothing very remarkable about the town. The main streets in the center have been modernized, but they remain narrow and rather mean. Some of the side streets retain the old character and an element of picturesque-ness. The churches, schools, and numerous public buildings substantially modify the congestion, which must once have been great. The newer streets in the outlying parts of the town are well laid out and adequate. As is usual in German towns, the public buildings are handsome, solid, and built to last, and they are rather more numerous than usual in Essen, which is a somewhat important center. It is the seat of the provincial courts of justice and the district headquarters of the Prussian State railways. Both are worthily housed. The townhall is new and sufficiently important.

THE INDUSTRIES.

Apart from Krupp's the industries are not extensive. There is one considerable iron works which makes a specialty of boilers, a chemical

factory, breweries, and several coalpits. The town lies over the coal bed and the mines run underneath it. The great Rhine-Westphalian Coal Syndicate—probably the most important industrial combination in Germany—has its headquarters at Essen. The products of the Krupp works are very varied. Their fame is chiefly associated with war material, but they minister no less to innumerable peaceful purposes. All kinds of finished and half-finished material for railways, ships, engines, tools, mills, and other industrial appliances are turned out in large and small quantities. The war department turns out guns of all sorts, of which 39,876 had been delivered up to the end of 1901, projectiles, fuses and ammunition, rifle barrels, and armor. The manufacture of offensive and defensive material is a lucrative game of see-saw, in which the governments of the world are pawns in the manufacturers' hands. It is like the burglar and the safe. The scientific possibilities are infinite, and the experts have only to turn their attention to each in turn and their customers must follow. A more powerful gun, a more vicious projectile, or a new ammunition, and the old defenses are obsolete. The governments hasten to provide themselves with the latest instruments of destruction. Then the metallurgical chemist brings a new hardening process or a new alloy on the scene and produces armor which defies the latest weapons; and again everybody must have it, or questions are asked in Parliament. Thus it happens that the Essener Hof—that most exclusive of hotels, which stands hard by the works and is reserved for distinguished customers—never lacks guests from all parts of the world. They are the emissaries of their governments, watching the execution of orders. There is not much fear that any of the great powers will outstrip the rest to an alarming extent. These matters are, of course, profound trade secrets; but somehow or other Essen knows pretty well what is going on at Elswick and Sheffield, which return the compliment, and all three have made up their minds about the merits and defects of the new French gun before it has been delivered.

This suggests a comparison as regards the workshops. Elswick is the single establishment which comes nearest to Essen in size and character, but the conditions are so different that comparison is hardly valid. The famous Armstrong works lie stretched out in a narrow belt along the left bank of the Tyne and are rather cramped for room. In some departments the shops are built in several stories and can not therefore be lighted from the roof; but the recently reconstructed foundry, measuring 770 by 75 feet, is a fine specimen of its class. The Krupp shops have been built at very different dates and vary accordingly, but as a whole they possess in a marked degree that order and cleanliness which is the most distinguishing feature of German factories. This extends to the foundries, where dirt, smoke, and confusion usually hold sway. A specialty here is the casting of very large ingots of crucible steel; it is a remarkable sight and an object lesson in German methods. Ingots of 85 tons are cast—a feat which is, I believe, not attempted anywhere else. The steel is melted in small crucibles which are carried by hand, and therefore contain no more than two men can lift. Scores of such crucibles go to the making of an ingot of considerable size, and they occupy many furnaces, which are ranged on both sides of the foundry, with the ingot mold in the middle. At the signal the furnaces are opened and the crucibles are drawn out and seized by a small army of workmen, who run

them down to the mold and pour them in. It is obvious that to do the thing on a large scale perfect method in preparation and order in execution are necessary. The maneuver is carried out with military precision and promptness. In a moment the place is aglow with the white heat of the furnace, the figures run from all sides, and come staggering down in pairs with the pots full of liquid steel. It is a scene of intense activity, but without confusion. One after another the glowing pots are emptied; the molten metal runs like thick soup and plumps into the mold with a bright sputter. In a few minutes it is all over; the furnaces close again, the used crucibles are thrown aside, and already the cast mass begins to congeal and change color; white presently dulls to yellow, and the tint deepens as you watch. The steel so made is the purest known, close-grained, homogeneous, and uniform throughout. I believe they do not make it in America, where the impatience of hand processes, which is characteristic and has led to such remarkable developments of automatic machinery, has its weak side. The most recently built workshops at Krupps are quite up to date in their construction; light, spacious, and airy; but they are in no wise superior to the newer ones at Sheffield, which are also fully as well equipped with modern appliances, such as electric cranes and hydraulic presses. The admirable shops of Vickers Sons and Maxim, in particular, can not be surpassed.

OTHER POINTS.

I mentioned the churches and schools above. Nothing is more striking in this part of Germany than the number of fine churches built or restored in recent years. The total provision of places of worship is small compared with that in English and American towns, where innumerable sects have their own conventicles; but the concentration of religious influences into two camps—Catholic and Protestant—results in the erection of much finer buildings. They really are churches, not mere barns or concert rooms, and embody some true sense of religious aspiration. Essen has at least five such modern churches—three Catholic and two Evangelical. The relative strength of the two main communions is, roughly, Catholic, 101,000; Evangelicals, 76,000, with about 1,800 Jews and a few dissenters. The elementary schools are accordingly divided thus: Catholic, 24; Evangelical, 17; old Catholic, 1, and Jewish, 1. The other public schools are a continuation and a trade school with three sections for (1) building, (2) engineering, (3) decoration; Gymnasium, Real-Gymnasium, Ober-Realschule, and higher girls' school. There is no "technical" school. The rapid development of the labor market has caused a great influx of workmen from other parts of Germany and from elsewhere, but this is a common feature in the Rhineland manufacturing towns today. Like Düsseldorf, Essen returns a Central member to the Reichstag. In the general election of 1903 the final majority over the Social Democratic candidate was 6,384.

Municipal enterprise is less developed in Essen than in Düsseldorf. The electric trams belong to one company and the electric light and power plants are leased to another. The public water supply is very fair, but it entails such a heavy draft on the river Ruhr that large reservoirs made by damming flood waters among the hills are contemplated. This is a common source of water supply in the Berg country,

and will be further mentioned in connection with Solingen. Essen is sewered and drained. The sewage is chemically treated, but there is the usual difficulty in getting rid of the solid residue.

Vital statistics (1901).—Population, 183,500; births per 1,000, 47.1; deaths per 1,000, 21.2; excess of births, 25.9; deaths under 1 year per 1,000, 7.7; suicides per 1,000, 0.08.

The very high birth rate, equaled only by that of Duisburg, and the low suicide rate (the lowest in the large towns of Germany) indicate a high degree of prosperity. Of the births only 3 per cent were illegitimate; this is also very low, and equaled by only four towns.

Finance.—Debt (1899–1900), £927,014 [\$4,511,314]; expenditure (1902), total, £370,450 [\$1,802,795]; per head, £2 0s. 8d. [\$9.82]; taxation, total, £279,150 [\$1,358,483]; per head, £1 10s. 7d. [\$7.40].

Pauperism.—Expenditure (1902), total, £34,900 [\$169,841]; per head of population, 3s. 9d. [\$0.81].

Miscellaneous.—Police force, 225; public houses, 416; churches, 13; theaters, 3; newspapers, 22; free library 1 (Krupps).

3. ELBERFELD AND BARMEN.

GENERAL FEATURES.

Here we have the true type of industrial community. These sister towns, administratively separate but actually one, like Manchester and Salford or Hamburg and Altona, are purely manufacturing places; they have been so for centuries, and as towns have never been anything else. They may fairly be compared with Bolton and Blackburn as to size and character, though there are important differences. Their manufactures are far more varied, they are not cotton centers, and they contain more of the trading element than the Lancashire towns, where the warehouse business is largely relegated to Manchester. In these respects they more nearly resemble Bradford and Halifax.

Elberfeld and Barmen are situated on the edge of the charming and romantic Berg country which lies a few miles east of Düsseldorf and northeast of Cologne. They form a continuous narrow winding belt of houses and factories about 8 miles long, hemmed into the small and rather deep valley of the river Wupper, a hill tributary of the Rhine. They are famous for their textile and chemical manufactures, for their unique hanging railway, and for the poor-law system inaugurated at Elberfeld and copied all over Germany. They are, or should be, infamous for their treatment of the beautiful little river to which they owe the origin and development of their industrial prosperity.

Centuries back this valley acquired a reputation for the bleaching of linen, and in 1527 the Herzog of Berg granted the inhabitants the monopoly of producing the yarn, to which they presently added the art of weaving. Their goods became known far and wide; they did a large export trade and waxed fat. In 1610 Elberfeld received a charter of incorporation, so that it has been a self-governing city for nearly three hundred years. Barmen can hardly have been less prosperous, for at this time it possessed 88 bleacheries; but it had to wait two hundred years for the same privilege. Both underwent the usual chastening discipline of war, fire, and pestilence. Like all the other towns in this part of the world, they were from time to time occupied by various troops, and occasionally plundered, burnt down, and devastated; but the sturdy race quickly recovered itself and drew profit from adversity, as all men of stamina do. When French troops were quartered on them they improved the occasion to establish business connections and extend their markets and their manufactures. Trade with France, promoted by Colbert, became important. Early in the eighteenth century the art of dyeing was introduced, and the use of wool, followed by silk and cotton, with lace and ribbon making, was added to the previous textile industries. Jacquard looms were introduced in 1821. Various allied manufactures, such as buttons and thimbles, began to be developed; and in spite of two large speculative failures—the Rhine West Indian Company (1821) and the German-American Mining

Society (1824)—the numerous industries, except spinning, grew steadily during the nineteenth century. The Wupper towns took their full share in the national development following the war of 1870. At the time of the French evacuation, after the fall of Napoleon Bonaparte, they had a combined population of some 30,000; in 1900 it had grown to 300,000, of which Elberfeld accounted for 156,000 and Barmen for 144,000. By the extension of the factories along the river banks the two towns have grown into one, and as they stand they may be said to constitute the greatest center for the production of drapery and haberdashery in the world. To that must be added a specialty which, more than any other, represents the triumph of Germany. I mean the manufacture of dyes and chemicals. Germany has made herself purveyor to the world of these products, and the Wupper Valley is the principal seat of the industry.

In its essential features this busy community more closely approximates the English type of manufacturing town than any other in Germany. There is the same throb and pulse of life, the same impression of energy, the same absorption in realities and sane acceptance of a work-a-day world, coupled with a determination to get as much enjoyment as can be got out of it. And there are the same unattractive accompaniments, of which more presently. We can leave the unpleasant things to the last and begin with the others.

THE HANGING RAILWAY.

. This is the most striking thing the two towns have to show. If sightseers visit them at all, it is generally to see the hanging railway, which is the first of its kind to be adapted to passenger traffic. It runs from Vohwinkel, a suburb at the lower end of Elberfeld, up the valley nearly to the far end of Barmen, which lies higher up the river. In other words, it traverses the entire length of Elberfeld-Barmen from end to end, and for nearly the whole distance it follows the river. It is, in fact, built over the river, and but for that convenient artery, which provides just the required space all the way through the heart of the place, it could hardly have been built at all. That is clear from the course of the railway, which also traverses the valley, but has to keep to one side; and of the trams, which have to make numerous detours, and are consequently very slow. The river happens to be wide enough, but not too wide, for the purpose, and it is exactly in the right place, for the houses and factories—particularly the factories—line both banks from end to end. The railway is suspended in the following manner: About every 100 feet iron latticework supports are planted on each bank, inclining toward each other at an angle. They are joined at the top by a girder, forming an arch over the river. There is thus a series of arches about 100 feet apart. An iron framework, light but strong, runs from one to another, and so forms a continuous line, running lengthwise above the stream. This structure carries a rail on its outer edge at each side, and the cars are suspended from the rails, the "up" cars on one side and the "down" cars on the other. Each car hangs from the rail on four wheels, arranged in pairs, one pair at each end, and held above the roof by powerful arms attached to the body of the car, which in appearance is very much like those on the great wheel at Earls Court.

Thus suspended over the river and driven by electric motors placed

between each pair of wheels, the cars run along the single rail at great speed, and with an extremely easy motion. At first some difficulty was experienced from a tendency to sway and rock, which even caused seasickness in very susceptible passengers, but that has now been overcome and reduced to an occasional and barely perceptible movement. There are stations at short intervals and the speed and freedom from obstructions make the railway an extraordinarily convenient means of locomotion. In a few minutes it lands you in any part of the town you wish: I know the overhead railways of New York, Liverpool, and Berlin, the London tubes, and the shallow underground railways of London (alas, too well), Boston, and Budapest; but in my opinion the hanging railway of Elberfeld-Barmen is more expeditious and agreeable than any of them. I doubt if it would be suitable to the dark and narrow streets of inner London, though at Elberfeld the end section to Vohwinkel leaves the river and is carried over the main street, but the system should not be ignored by the royal commission on London traffic. Mr. F. N. Gütersloh, a retired engineer who for many years held an important post under the Indian government, and now lives at Düsseldorf, could give competent technical evidence about it. He has made a study of the system, which he considers admirably suited to a line from Calcutta to Simla. The first portion of the Elberfeld line was opened in March, 1901, the last at the end of June, this year [1903]. The total length is $8\frac{1}{4}$ miles. The cars hold 50 passengers each, and they run at intervals of a few minutes, either singly or two or more together, according to the requirements of the traffic. The fares vary from 10 pfennigs [a trifle over \$0.02] to 50 pfennigs [\$0.12], according to class and distance. The line was built for the Kontinentale Gesellschaft für Elektrische Unternehmungen, Nürnberg, by the Maschinenbau-Aktiengesellschaft, Nürnberg. It is standing evidence of German enterprise in electrical engineering. I have recently heard that similar lines are to be built in Berlin and Hamburg.

THE TOWNS.

It is hardly necessary to say that Elberfeld and Barmen are determined rivals. To say anything in praise of one within the hearing of a citizen of the other is like speaking of Bolton to an Oldham man or mentioning Bradford in the streets of Leeds. Your hearer promptly calls attention to the superior merits of his own place of residence. This rivalry is a healthy and stimulating influence; it keeps a vigorous public spirit going. There are many signs of it on the Wupper. The towns—or at least the central parts of them—are old and unsuited to the great traffic of to-day. They are crowded with factories; their situation is unusually cramped, making extension difficult, and the population has increased very rapidly in recent years, largely by the influx of workmen from outside. In these circumstances great efforts are required merely to prevent extreme congestion and squalor; and they have been made. Anyone familiar with such matters must readily recognize how much has been done both by public and private action, not only to mitigate actual evils, but to increase the dignity and amenity of life. The heart of Elberfeld in particular is a labyrinth of queer little crooked streets, in which the keenest sense of direction is apt to be at fault; but they have made room for a magnificent town hall, occupying a commanding and central position, and have driven a

new street through the crowded buildings hard by. The town hall cost £185,000 [\$900,303] and the new street £450,000 [\$2,189,925]. Similar improvements are being carried out elsewhere, particularly on the river bank, where they are very badly needed. In short, Elberfeld is on the road to be quite a fine town. It would be gross flattery to say that it is so already, in spite of the things mentioned and the open space in front of the chief railway station, which makes a favorable first impression, flanked as it is by the municipal theater and baths on one side and the State railway offices on the other. Many things remain to be done before Elberfeld is entitled to a first-class certificate, and I shall take the liberty of mentioning some of them before I have finished. Barmen seems to be somewhat less ambitious, but it has some more open streets and a more pleasing air; it is more spread out, less shut in by the hills, and so far as buildings are concerned it deserves special credit for the really dignified Ruhmeshalle, or Hall of Fame, erected by the citizens to commemorate the Franco-German war. The hall houses, among other things, the town library, and is an agreeable change from the interminable Bismarck and other "denkmals," which are strewn about Germany like the statues of her late gracious majesty in our own happy land, and with about the same sense of art. The Barmen Ruhmeshalle redounds doubly to the fame of the town, for the architect was the director of the Barmen technical school for architecture, and won the first prize in an open competition.

The educational facilities are exceptionally complete; for, in addition to the full complement of elementary and higher schools, there are "technical" schools for textiles, for architecture, and for engineering, as well as art-trade and hand-worker schools. Of the technical schools, the most important is naturally that which provides instruction in the predominant local industries, which are various kinds of textiles. It is situated in Barmen. Though not so large as some of the newer ones and with a less ambitious equipment, the building is adequate, the teaching staff numbers 17, and the installation includes about 100 machines. The curriculum is particularly directed to the Wupper Valley specialties. Practical instruction is given in weaving dress and upholstery materials, braids and ribbons, in knitting, lace making, art sewing, designing, dyeing, and finishing. There are day and night classes, the former for manufacturers, managers, and heads of departments, the latter for foremen and forewomen and for ordinary hands, both male and female. The various grades of students are taught in separate departments. The full course varies from half a year for workpeople to four years for designers, and the fees from 30s. [\$7.20] for workpeople to £10 [\$48.67] for manufacturers, managers, buyers, and salesmen, dyeing and finishing experts. That is for Germans. The fee for foreigners is £50 [\$243]. The same rule applies to all the Prussian schools of this class, which are under the control of the ministry of commerce. Elberfeld has quite recently started a school of commerce and compulsory continuation schools.

The housing of the working classes in this thronged and crowded valley is far from satisfactory, and less appears to have been done toward providing better accommodation than in several other industrial towns in the district, although Barmen was one of the first to start a building company for the purpose, more than thirty years ago. Down to the end of 1901 the company, which is of the nature of a benefit society, had built 365 houses in 10 different quarters of the

town, housing some 2,500 persons, the majority of whom were factory workers and their families. Some of these houses have a very pleasant appearance; they are certainly better and cheaper than the ordinary dwellings obtainable, but even in them there is much overcrowding. An official report published in 1897 gave the proportion of tenants living more than two in a room as 16 per cent. In neither town has the municipality provided any housing, but Elberfeld keeps a house register for the benefit of the working classes. The impression derived from observation is not favorable. Tenement buildings of many stories abound, and in the more congested districts rise up one behind the other on the hillside. Some interesting statistics, based on the census of 1900, have been prepared by Dr. Otto Landsberg, director of the statistical office of Elberfeld. In the most congested part of the town 62.9 per cent of the inhabited buildings contained over 6 households each; 68.4 per cent contained upward of 20 inhabitants, and 12.1 per cent upward of 50 inhabitants. The density of population here was 190 to the acre. I have no corresponding figures for Barmen, but the overcrowding there is less obvious, and the average number of persons to a dwelling-house is slightly lower. Manufacturers appear to have done less to provide housing for their people than in many other places, but credit should be given where it is due. The great chemical company, "Farben Fabriken," has built 50 superior houses, containing 200 families, and the well-known firm of D. Peters & Co. has a remarkably complete model settlement at Neviges, an outlying manufacturing village. The average weekly rent for an unfurnished room is 2s. 4d. [\$0.56] in Barmen and much the same in Elberfeld.

In spite of the overcrowding, these towns are remarkably healthy. The death rates in 1901 were, Elberfeld 17.2, Barmen 16.5 per 1,000. Such rates are so remarkable for towns of this size and class that I am somewhat at a loss to account for them. One factor may be the presence of a large number of single immigrant workmen in the prime of life; if crude rates were corrected by the age coefficient, they would probably be higher. Another reason is a comparatively low infantile death rate—5.7 and 5.3 per 1,000, respectively—which is surprising in a place where the birth rate is high and many women are employed in factories. However, the valley is undoubtedly healthy, and probably the chief factor is the situation of the houses, which are built on natural and often steep slopes. Everything is carried off rapidly, and the ground does not become wet or saturated with filth.

Both towns have several good parks and playgrounds, thanks chiefly to their Verschönerungsvereine, or improvement societies, which appear to be very active and public-spirited bodies. They have preserved portions of the charming wooded scenery which once filled the valley and still lies on the outskirts, beyond the range of bricks and mortar. No town of this kind has prettier surroundings. The place must once have been lovely.

The churches are less noteworthy than in many neighboring places. I do not know if this is due to the preponderance of the Evangelical element, which includes about four-fifths of the population. The disparity was formerly still greater, but in the last ten years there has been a more rapid relative increase of Catholics in Elberfeld, doubtless by immigration. The following details with regard to religious sects, from the census of 1900, may be of interest as showing the state of

this element in a German Protestant town. They are classified thus: (1) Evangelical, 113,008; (2) Evangelical sects, 593; (3) Catholic, 40,122; (4) other Christians, 1,473; (5) Jews, 1,679; (6) others, 88. (1) The Evangelicals are further divided into 13 subdivisions, of which the important ones are: Evangelical-Lutherans (52,166), and Evangelical-Reformed (43,357). There are 15,686 unspecified, and the remainder consist of insignificant groups or solitary individuals, such as 1 "Zwinglian" and 1 "Walderiser." (2) The "Evangelical sects" are 7 in number. They include 283 Baptists, 21 Anglicans, 21 Methodists, 11 Mennonites, and 1 "Herrnhuter." (3) Of the Catholics, 40,000 belong to the Church of Rome, 10 to the Greek Church, and 42 are "Altkatholisch." (4) The "other Christians" include 2 members of the Salvation Army, 27 Adventists, 30 Darbyites, 1 representative of the *Versammlung Gottes*, 43 Free Religionists, besides "Dissidents," "Christian Dissidents," and plain "Christians." (5) The last class includes 1 "Heathen," 2 "Freethinkers," 22 "Atheists," and 40 "religionless." This curious collection goes to show that the spirit of the "Marrow-kirk" is not unknown in Protestant Germany. Of the 36 varieties and subvarieties of conscience enumerated, of course by the people themselves, 6 are represented by solitary individuals.

In spite of the Social Democratic doctrines, which have a strong hold here and are still hostile to Christianity, though a profession of indifference has been found politic, the people have the character of being very God-fearing and religious; and that is borne out by the exceptionally low number of illegitimate births. The proportions are (1901), Elberfeld 5.8, Barmen 3 per cent of the total births; and Elberfeld 2.1, Barmen 1 per 1,000 of the population. In Chemnitz, which more nearly resembles Elberfeld-Barmen than any other industrial town in Germany, the respective rates are 12.1 and 4.8, but the difference is partly due to higher wages and superior prosperity in the Wupper Valley. The Elberfeld poor-law system will be more fully explained under the heading "Pauperism," but it deserves mention here in connection with the town which invented it. The claim is, I believe, disputed by Hamburg or some other place, as such claims generally are, but Elberfeld certainly was the first to apply and develop the idea, and deservedly enjoys the credit of it. Broadly speaking, it is an elaborate system of outdoor relief, organized in great detail and carried out, not by paid officers, but by private citizens, who give their services gratuitously. Such services are compulsory in any place where the system has been adopted, but its adoption is voluntary. In other words, the citizens voluntarily assume a burden which entails upon any individual selected real and personal sacrifice of time and trouble of quite a different kind from that devolving on boards of guardians or other representative bodies. It is a striking example of that public spirit and sense of duty which are so marked a feature of German civic life.

THE FACTORIES.

Some idea of the number and variety of the industries carried on has already been given. I can hardly think of any town where there is so much variety; and this is an important factor in the maintenance of steady employment. Towns which have all their eggs in one basket, so to speak, like Crefeld, Bradford, Oldham, Lavell, and many others,

are hit very hard when a depression occurs in their specialty; there is nothing else to fall back upon. But with plenty of variety this does not happen; as, when one branch is depressed, another is often unusually brisk. Money is kept circulating, and persons thrown out of work in one direction have a chance of temporary employment in another. Almost the only large branch of manufacture which does not find a place is spinning, which is fortunate for Yorkshire and Lancashire. The Wupper is one of their best foreign markets. All kinds of dress materials—wool, silk, cotton, and mixed; dress accessories, particularly braids, trimmings, ribbons, embroidery, laces, and buttons, carpets, curtains, and other furniture stuffs; dyes and chemicals—these are the staples. But there are also rubber and leather goods; gold, silver, copper, and aluminum wares; textile machinery, paper, soap, oilcloth, wall papers, stained glass, and many others. The factories, as a rule, are small and consequently very numerous. Many are also old. There are some fine new mills at the far end of Barmen, but modern buildings are the exception. The factories are placed all along the river on both banks, with their backs to it, and all their refuse runs into the stream. The view, once hidden, but now revealed by the hanging railway, which runs between them, is positively painful. The mills are not so bad, but the dye and chemical works are most offensive. The development of these industries dates from 1785, when the secret of turkey red was acquired; the discovery of aniline colors gave it a great impetus, and the subsequent immense expansion of industrial chemistry in Germany has nowhere been more actively applied. In particular, Elberfeld has the honor of housing the renowned "Farben Fabriken" company, at whose enormous works 160 expert chemists are said to be employed. Among other blessings showered upon the world by their labors are constant additions to the interminable series of synthetic and other new drugs, including those anodynes and sedatives which are largely responsible for the increasing prevalence of "neurasthenia" and inebriety among women of the upper classes.

Now, these works are doubtless good for trade, but they have their seamy side, and it does not need much looking for. The Wupper has already suffered some indignities before it enters Barmen, but so great is the volume of pure water brought down from the hills by the rapid little stream that it is still quite clear. The tint darkens steadily as it passes mill after mill, and by the time it reaches Elberfeld it is fairly black; but the filth continues to be poured in. Every factory adds its shameless contribution—red, blue, yellow, purple—varied by drains carrying the surface water from the town, mingled with the household slops that meander freely down the gutters in the side streets. The stream emerges opaque, slimy, black as ink, with a foul iridescent scum, and in that condition it wanders away down the lovely wooded valleys by Müngsten and Burg, which it pollutes with its disgusting presence. It is half solid with filth, and its banks are covered with a deposit of black and stinking slime. We have some pretty bad specimens of river pollution in England, but nothing like the Wupper. It is the most abominably ill-used running water in the world. It should be a thing of beauty and delight; it is a black disgrace and a public nuisance. Presumably this iniquity is permitted to continue unchecked because those who perpetrate it control the conduct of public affairs; but if the

chemical works, instead of boasting of the number of chemists they employ and the millions of capital they have invested, would apply the knowledge of the one and some small portion of the other to disposing of their refuse and abating the nuisance they might command more respect than it is possible to pay them at present.

There is some hope of it, perhaps; for, as I have said, the place is improving. Indeed there are signs of it even in the river. Evidently innumerable drains used to empty into it which now do not. The sewage is, I believe, carried down below, which is better than running it through the town. Drainage and the disposal of sewage are still among the weak points of German towns, although great improvements have been effected in these respects. Household slops running in the gutters are a common sight. There is no serious harm in it, but it is extremely unsightly. The streets are a weak point in other respects; the paving is generally of the roughest, and that is markedly the case here. There is much room for improvement also in the way of smoke prevention, which does not seem to be attempted. The heavy pall hangs in the valley, particularly at the lower end of Elberfeld, and spoils the remnants of what must have been a beautiful scene before the chimneys multiplied. It is inexcusable, because it is not caused by foundries or furnaces. There is probably no spot where the handiwork of nature has been so badly marred—the Monongahela Valley could not have been beautiful even before Mr. Carnegie went there. As one enters the lower end of Elberfeld by the hanging railway and glides over the blackened river through the ironwork cage made by its beams and girders, past the forest of chimneys and the discolored, dilapidated factory walls, with the tall gaunt tenement houses looming through the smoke in the background and climbing up the hillside, the hideousness of it all is heightened by the gracious sweep of the hills, the glimpse of woods on their heights above the belt of bricks and smoke, and the rush and turn of the water below. Surely Elberfeld could do more to reconcile its industrial activity with the natural charm of its situation.

STATISTICS OF THE TOWNS.

Vital statistics, 1901.

Town.	Popula- tion.	Rates per 1,000.				
		Births.	Deaths.	Excess of births.	Deaths under 1 year.	Sui- cides.
Elberfeld	157,000	34.5	17.2	17.3	5.7	0.15
Barmen	142,000	33.5	16.5	17.0	5.3	.22

The proportion of illegitimate births was, as already mentioned, 5.8 per cent in Elberfeld and 3 per cent in Barmen.

Finance.

Town.	Debt (1899).	Expenditure (1902).		Taxation (1902).	
		Total.	Per head.	Total.	Per head.
Elberfeld	\$9,810,348	\$3,623,620	\$22.93	\$1,431,530	\$9.02
Barmen	7,640,614	1,999,757	13.88	1,070,873	7.43

Expenditure on account of pauperism (1902).

Town.	Total.	Per head.
Elberfeld	\$134,087	\$0.85
Barmen	109,686	.77

Various statistics.

Town.	Police.	Public houses.	Churches.	Theaters.	News- papers.	Free libraries.
Elberfeld	230	496	(?)	3	8	1
Barmen	179	483	10	2	8	1

4. CREFELD AND MÜNCHEN-GLADBACH.

CREFELD.

The name is written with a K in official Government documents and by the local chamber of commerce, but with a C by the municipality and generally by the public; so there is authority for both, and the stranger can take his choice. But however the name is spelled, Crefeld is a very curious place. It is purely a manufacturing town, but totally unlike any other that I have seen in any country. In the first place, there is no obvious reason why it should be the seat of manufactures at all. It is not near coal or running water or any such natural resource, nor is it on a great highway. It lies on the left side of the Rhine, but several miles from it, and about 15 miles to the northwest of Düsseldorf, with which it is connected by a light electric railway running across a dreary and almost uninhabited plain. The site is perfectly flat. In the second place, it is laid out in a very peculiar manner. The central part of the town is inclosed by four wide streets or boulevards, called the north, east, south, and west "walls," which form a large rectangle; and the other streets are almost equally regular. The plan is on very modern lines, but the town is not. The building, again, is peculiar; the houses are neither the wooden-beamed green-shuttered cottages of the smaller Rhineland towns and villages nor the many-storied blocks of modern urban Germany. They are small white houses of two or three stories. There is a foreign air—Dutch or Flemish—about it. But however this may be, it is a highly attractive place, clean and tidy, with plenty of trees, gardens, and open spaces. Its aspect is modest, quiet, and "freundlich." Within the town the bustle of trade is conspicuously absent, and nothing is to be seen of factory life. Yet Crefeld is as completely a mill town as Oldham itself, and the mills are hard by, ranged on the fringe of the streets, numerous, modern, red brick, business like. They are chiefly devoted to the manufacture of silks and velvets, which form the great staple industry. Crefeld is the Lyons of Germany.

Little is known of the early history of Crefeld or of the origin of its rather singular name, which has taken many forms in the past; but it is a fairly ancient place. The earliest authentic mention occurs in 1166; and the dignity of a Stadt was conferred in 1373 by Kaiser Karl IV. Crefeld must have been then a center of some local importance; it had the right of holding the weekly and yearly markets, which are still a great feature of the town life. The textile industry does not appear to have come to the front until the seventeenth century, when the manufacture of linen was developed, if not introduced, by Mennonite immigrants. Silk was introduced in the latter half of the same century by the Dutch family Van der Leyen, who settled in Crefeld and worked up the business with great energy and success. Under the fostering influence of royal patronage, free imports of raw materials, and a protective tariff against manufactured goods, the Leyen

mills thrived mightily until they came to employ 3,000 workmen. These happy conditions passed away under French occupation in 1795; free competition with the manufacturers of France hit the German looms, just as it did the English at a later date when the duty on foreign silks was abolished. The reestablishment of Prussian rule and the Zoll tariff restored their prosperity, and led to a great extension of the industry. Hand looms have gradually given way to mechanical power; the number of mills has increased; and other associated industries, particularly dyeing, the manufacture of colors, and of textile machinery, have been developed. The following figures show the average number of looms at work in the various branches of the silk industry in 1892 and 1901:

Looms at work in silk industry at Crefeld.

Kind.	1892	1901
Hand	13,766	6,551
Power.....	4,816	10,268

The best-known institution in Crefeld is the Textile School, which enjoys a wide renown. A silk-weaving school has existed since 1855, but the present building was opened in 1883, when fewer rivals existed than to-day; but it still holds its own, and attracts many students from other countries. It is a fine building, planned on a generous scale, with broad corridors, numerous and spacious rooms, and has an ample installation of machines, a library, and an exceptionally complete museum. Like all German educational institutions, it does not try to cover too much ground—a mistake made by some technical schools both in England and in America—but specializes in a well-defined direction. It aims at teaching the Crefeld industries, and it teaches them thoroughly; but it takes account of new branches and helps to encourage them. The total number of students in the winter session of 1901-2 was 252, of whom 136 took the Sunday course, which is open to foremen. In 1895 the institution was extended by the addition of a dyeing and finishing school. The number of students in this department during the same session was 72, of whom 52 had previously acquired practical knowledge in the factory; only 10 came from the university or technical high school. Special attention is paid to the artistic and scientific studies—design, color, and finish—which are of special importance in silk goods. The fees are £15 [\$73] to Prussians, £22 12s. [\$109.94] to other Germans, and £60 [\$292] to foreigners. The products of the looms are sold; in 1901 they brought in more than £225 [\$1,095]. Besides teaching, the school undertakes the analysis of samples for the trade and gives information to manufacturers, who for their part support and encourage the institution from which they draw their expert skill. There is no doubt that it has been invaluable in maintaining the reputation and industrial efficiency of Crefeld in the face of severe and increasing competition. In 1901 it cost the town £1,436 [\$6,988] and the State double that amount.

In 1870 the population of Crefeld was 58,000; in 1900 it was 107,000. It is not increasing so rapidly as many of its neighbors. The curse of the textile town is on it, and the birth rate is falling. In 1901 it was only 28.5 per 1,000, or nearly 20 below that of the iron towns just

across the Rhine—Duisburg and Essen—and more than 10 below that of its next-door neighbor, the equally textile München-Gladbach. To some extent this is offset by an exceptionally low death rate, 15.6 per 1,000, which leaves the sufficient margin of 12.9 per 1,000 excess of births over deaths. This is not the place to discuss the obscure and far-reaching problems involved in these matters, but it may be pointed out that a diminished death rate is not a matter of congratulation, in so far as it is merely the sequence of a diminished birth rate. That is certainly the case to some extent in Crefeld, but apart from that the town is, no doubt, exceptionally healthy. The death rate from consumption is among the lowest in the 95 chief towns of Germany, and that from typhoid actually the lowest. Among the causes of this fortunate state of things are an excellent water supply, superior housing conditions, and good earnings. I have already mentioned that the houses run small, as houses go in these towns, and the people are therefore less thick on the ground. The average number of persons to each house is only 14, compared with 18.7 in Elberfeld, 18.9 in Barmen, and 19.5 in Düsseldorf. There does not appear to have been so much difficulty about housing in Crefeld, and, though rents are high, neither the town nor employers have been forced to do much in this direction. There is one Workmen's Dwellings Association, founded in 1900. It has put up buildings to house 128 families in flats of 3 to 5 rooms. The rents are from 80 to 84 marks per annum, or 1s. 6½d. to 1s. 7½d. [37 to 39 cents] a week for each room. Rent elsewhere in the town is considerably higher.

The silk mills afford employment to many girls and women, and consequently the family earnings are good. They are employed both in weaving and in winding, but particularly in the latter, which is generally done entirely by girls. A manufacturer who was acquainted with Bradford informed me that the girls are better paid in Crefeld. Weavers can earn up to 36s. [\$8.76] a week, but that is exceptional. The place has been hit by the prevailing depression which set in in 1900, but less severely than its iron and steel neighbors. It has also felt the effects of hostile tariffs, particularly the American; but on the other hand the home market has expanded. Silk is an article of luxury, and as the standard of wealth has risen in modern Germany such articles have come more in demand. Crefeld still exports, but the home trade, which was only 31.46 per cent in 1878, had become 55.41 per cent in 1901. In spite of depression the town wears a prosperous look. There is a public house to every 274 inhabitants, and I have been told that the factory hands drink one-third of their wages. That is, no doubt, too sweeping an assertion; but that it is not entirely a libel I have had some ocular proof. The factories are not large, but modern and good in every respect. I have nowhere seen a more admirably appointed mill than that of Messrs. Krahnen & Gobbers—a model of cleanliness, order, and attention to light, air, and sanitary arrangements. A great deal of the machinery in use at Crefeld still comes from England—not so many looms, which are now made largely in Germany, as dyeing and printing machines.

The population is chiefly Catholic. Of the elementary schools, 35 are Catholic, 9 Evangelical, and 1 is Jewish. In addition to the usual higher schools and the Royal textile schools already described, there are continuation schools, trade and art hand-work schools, and a commercial school maintained by the chamber of commerce, with a

department for girls. The number of male students in the summer session of 1901 was 369, of whom 314, or 85 per cent, came from the elementary schools; on the girls' side there were 156. They are taught arithmetic, bookkeeping, French, shorthand, and typewriting.

Crefeld is connected by railways with Cologne, Cleve, Duisburg, and München-Gladbach, and, as already stated, with Düsseldorf by an electric line. It returns a central member to the Reichstag.

Vital statistics (1901).—Population, 108,900; births per 1,000, 28.5; deaths per 1,000, 15.6; excess of births, 12.9; deaths under 1 year, per 1,000, 5; suicides per 1,000, 0.09. Of the births, 5.2 per cent were illegitimate.

Finance.—Debt (1900), \$2,919,900; expenditures (1902), total, \$1,017,244; per head, \$9.34; taxation, total, \$766,960; per head, \$7.04.

Pauperism.—Expenditure (estimated, 1902), total, \$129,502; per head, \$1.18.

Miscellaneous.—Police force, 125; public houses, 398; churches, 8; theaters, 2; newspapers, 16; free library, 1.

MÜNCHEN-GLADBACH.

This town with a double name—commonly written M. Gladbach to distinguish it from another Gladbach in the Rhine province—is the center of the chief cotton manufacturing district in Prussia. Germany is not famous for this industry, which is still in a comparatively early stage of development, and consequently the town is but little known to the world; but it has a particular interest for that reason. Here is to be seen a branch of manufacture in which Germany does not yet excel; and the manner of its cultivation and growth is worth noting.

In 1860 the population was about 17,000; it is now over 60,000, and the increase is due to cotton. There has hardly been a more rapid development in the Southern States of America. And Gladbach is only the center of a large district more or less given up to the manufacture of cotton with the usual allied businesses. The town itself is old, though the industry is young. It lies rather picturesquely on a hill. Here a church is said to have been built in 793; and on its destruction a couple of centuries later a second took its place, together with a Benedictine abbey, which was ruled by a succession of forty-six abbots down to the Napoleonic occupation. The name München is supposed to be derived from the monks (Mönche) who were so long connected with the place. The old minster church remains yet, a stately object, looking down from the steep escarpment of the hill upon the factories spread out below; the crypt dates from 972 and the nave from the twelfth century. A more striking chronological and architectural contrast is seldom seen. The old monastery buildings are now municipal offices. This old part of the town stands apart from the mills, which are spread out on the low ground to the south and east at the foot of the hill, and constitute, with their workmen's colonies, parks, and schools, a new quarter. The cotton industry appears to have been brought to Gladbach—which lies on the left side of the Rhine about equidistant from Crefeld and Düsseldorf and not much farther from Cologne—by manufacturers from the Wupper Valley, who found it convenient for political or fiscal reasons at the beginning of last century to transfer their cotton business to the other side of the Rhine. Gladbach probably attracted them because it had a good

labor market on account of the old hand-linen industry, which had long flourished there, but latterly fell on evil days. At that time the spinning and weaving of cotton also was entirely done by hand. The first mechanical spinning plant was only put up in 1845, and spinning is still the weakest spot. In 1895, however, there were in the Gladbach district over 400,000 spindles at work. This is, of course, a trifle to Oldham, with its 12,000,000 spindles, but then Oldham has been much longer at it and concentrates more on spinning, whereas Gladbach has a larger proportion of looms running.

There is no doubt that Germany means to go forward with this branch of textiles; and an earnest of her intention is to be found in the new technical school, opened in 1901, at a cost of £30,000 [\$145,995]. This is the latest thing of its kind, and in some respects surpasses any other that I have seen in Germany, England, or the United States. It concentrates its energies upon the cotton processes, and is divided into three separate sections: (1) Spinning; (2) weaving; (3) dyeing and finishing. The class rooms are housed in a handsome, red brick building, and the practical installation adjoining is laid out as a small mill, driven by a steam engine of 120-horsepower. It is a model in all its appointments, lighted from the roof, steam warmed, provided with electric light and the most recent methods of ventilation. In the spinning section courses are held for manufacturers, managers, and overseers. The course lasts one year, and consists of forty-two weeks of forty-four hours each. Sixteen out of the forty-four hours are devoted to practical work. Students must be not less than 16 years old and have had a good school education; it is preferred that they shall have had a year's previous experience in practical work. The fees for the full course are £10 [\$48.67] for Germans and £50 [\$243.33] with £3 [\$14.60] entrance fee for foreigners. The yearly fee for the workmen's course is 30s. [\$7.30]. It is interesting to note that in the carding process the machines taught are those of Howard and Bullough, Dobson and Barlow, Hetherington, Tweedales and Smaley, Platt, Lord, Asa Lees, and the Elsässische Maschinenbau Gesellschaft; in mule spinning those of Parr Curtis, Asa Lees, Dobson and Barlow, Platt and Threlfall. Lancashire still heads the world in cotton machinery, at any rate. They spin up to 80 counts in the school, and there seems to be no reason why they should not spin up to 150 or more with the aid of sprinklers, as they do at New Bedford, Mass. Skill is the thing lacking, and that they are determined to acquire. It is only a matter of time; we may expect to see the art of fine spinning mastered in Germany by and by, as others have been mastered, by degrees. The other two sections of the school have very much the same conditions, except that the dyeing and finishing course lasts two years. The mill undertakes work for the trade, and thus to some extent realizes the conditions of commercial production.

Another sign of industrial enterprise not far from the school is a large colony of workmen's houses erected by the local building society. They are of different sizes, but the most frequent type is a semi-detached, two-storied building containing four families. They all have gardens and ample space about them. The yearly rent for a dwelling of four rooms is £8 [\$38.93], or about 3s. 6d. [\$0.84] a week, which is very low for a really good house, such as these are, and much less than in other parts of the town. The society gives workmen facilities for purchasing their houses, and a large number do so. Down to the end

of 1902 it had built, since 1869, 615 houses for sale and 31 larger ones, housing 7,800 persons in all. A good many houses have also been built by employers, notably the firm of F. Brandts, who have provided many benevolent institutions for their hands, including a park and playground, which is open to the public. The rent for a dwelling of five rooms in these houses is £7 10s. [\$36.46] per annum. Taken altogether, the housing in Gladbach is decidedly above the average; rents are cheaper, and there is less overcrowding. The mills, many of which belong to companies, are also good. In other respects the conditions of industrial life are favorable. There are at least two public parks and an admirable set of public baths. These institutions figure prominently in most German industrial towns, and are splendidly equipped with large swimming baths, numerous and varied private bathrooms, medicinal baths, steam engines, electric light, and so on. They are kept beautifully clean, and often have their own water supply from an artesian well. To anyone who remembers the Germany of old, when no one could swim, bathing was thought a proof of insanity and washing a dangerous eccentricity, no change is more remarkable than the conversion in this respect. It is largely due no doubt to the teaching of hygiene, but also to military training. The daily bath is still exceptional in any class of society, but German workmen and factory hands are cleaner than our own, during the week at least. The sergeants take care of that in barracks, and the habit sticks.

About five-sixths of the population are Catholic, and the town is the headquarters of the Christian Trade Unions, whose newspaper is published here. Their organizations are called "Christian" to distinguish them from the "Social Democratic" trade unions. They were started in 1894 to meet the views of workmen who objected to the anti-Christian and revolutionary principles of Social Democracy, and their aim is to improve the condition of the work people by legislative reforms and organized self-help, independently of political parties. They are counter organizations to the other "free" trade unions, in so far as the latter allow themselves to be exploited by the Social Democratic political party. Further details of this interesting movement will be given under the head of trade unions; it is merely mentioned here in connection with the town. At the recent election the Social Democratic candidate for this constituency was defeated by an immense majority.

Gladbach is connected by railway with Düsseldorf, Crefeld, Cologne, and Aachen, and is the center of a considerable traffic. For the rest it is an unpretending, busy little town, with irregular streets and low houses, rather ragged and unkempt on the outskirts, but not without attraction.

Vital statistics (1901).—Population, 58,600; births per 1,000, 39.4; deaths per 1,000, 18.7; excess of births, 20.7; deaths under 1 year, per 1,000, 7.2; suicides per 1,000, 0.14. Of the births 4.1 per cent were illegitimate.

Finance.—Debt (1900), \$1,393,644; expenditures (1902), total, \$431,415; per head, \$7.40; taxation (1902), total, \$403,676; per head, \$6.80.

Pauperism.—Expenditure (estimated, 1902), total, \$65,973; per head, \$1.10.

Miscellaneous.—Police force, 59; public houses, 212; churches, 10; theater, winter season.

5. SOLINGEN, AACHEN, AND DORTMUND.

SOLINGEN.

In Solingen one enters a different world. It does not resemble any of the towns previously described, but has a peculiar interest of its own. The reputation of the little place goes back to the Middle Ages, and as it stands to-day it takes one back to them; it produced the same wares then, and to a certain extent it produced them under the same conditions. No industrial town has been so little modernized, in spite of the appearance of the factory and the building society's activity.

Solingen lies among the hills of the Berg country, almost due south of Elberfeld, and on the road to nowhere. This country has great charm in a quiet way, and is very little known. If I remember right, Baedeker passes it over with contemptuous and ill-deserved brevity. But English holiday makers who do not always want to go where everyone else goes might well turn aside here instead of rushing on to the upper Rhine or some other cockneyfied playground. It is only a few miles beyond Düsseldorf, which is but thirteen hours from London. I commend it to pedestrians and sketchers. They will find a land of deep, winding valleys thickly clothed with wood; picturesque villages and old-fashioned inns; running water everywhere; and, tucked away among the hills, artificial but charming lakes of blue water made by damming up the valleys to form reservoirs. For central points there are the noble Schloss at Burg, the model of a mediæval stronghold, and the Dom at Altenburg, the rival of Cologne, hidden away as it is in the heart of the country.

These details have something to do with Solingen and its neighbors in more ways than one. The hill reservoirs supply them with water; the power obtained from the streams explains the selection of this neighborhood for the cutlery industry, which was originally introduced by the great noble, Graf von Berg, whose family seat was the Schloss of Burg. The brooks, which are innumerable, turned the cutler's grindstone or worked the forge, and to this day more than one of these lovely valleys is but a series of little rural factories extending for miles, one below the other, each with its head of water. The whole countryside is filled with iron and steel hand industries, and the two capitals are Solingen and Remscheid. They lie on either side of the deep valley of the Wupper, into which the smaller streams find their way. The former is the headquarters of the cutlery, the latter of the file-cutting industry. There are many minor centers, such as Ronsdorf, Cronenberg, and Lüttringhausen; their spires rise against the sky line, for it is a peculiarity of this country that the towns are on the high ground; they look at each other across the valleys. So it is with Solingen and Remscheid. The railroad which joins them crosses the valley at Müngsten by the famous high-level bridge, which was

opened in 1897. It leaps the river by a single span 520 feet long and 348 feet above the bed of the stream. The view from the bridge is striking. The only blot on the scene is the unfortunate Wupper, which still carries the foul burden of Elberfeld's refuse and trails its inky slime—a broad black sewer—through the green woods for miles and miles past cottage and castle. The clear little brooks, hurrying down from the side valleys, disappear forever in its filth; all beauty and romance die at its poisonous touch. How long are people here going to put up with this abomination?

Solingen fits well with the neighborhood. It is delightfully old-fashioned and remote, a maze of little crooked hilly streets, queer turns and corners; full of houses small and low—really cottages—green-shuttered, laced with timber beams or faced with slates. It has a population of 46,000 or so, and is the center of a populous district; so we must call it a town, a busy, brisk, and cheerful country town, though it has rather the characteristics of a large village. Sheffield must have been like this once long ago. The people are all engaged in the cutlery trade or minister to it; about 29,000 are employed in and about Solingen. They make knives and forks, scissors and swords. The art is believed to have been brought from Damascus by Graf von Berg on his return from the Crusades; but an alternative theory traces it to importation from Styria. However this may be, Solingen workmen early acquired a wide reputation and sometimes took their skill far afield. One of the names found on old Toledo blades is German and is still borne by cutler families in the place. The art was jealously guarded by the old guilds—the smiths, temperers, grinders, and finishers—who strictly limited the apprentices and the output. Every master had to have a trade-mark, which was registered by the local authority, nailed up on the church door, and had a legal validity. The famous sign of the Twins dates from 1731, when it was registered by Peter Henckels; it has been borne by the same firm ever since. Their factory is the largest in the place; but out of 2,000 workmen only 800 are employed in the works, the remaining 1,200 work at home. This is the rule; the great bulk of the industry is carried on at home, as in old times, on the "chamber" system. It is encouraged by the local authority, which provides the men with gas and electric power, in lieu of the old water wheels. It has thus been preserved and developed alongside of the factories, which first came in during the last century and helped to revive the trade which had come to grief during the French occupation. (How often one hears the same story of Prussian industries.)

I have had no opportunity of observing the conditions under which this "dangerous" trade is carried on at home; but they can not be worse than those prevailing in the tenement chambers at Sheffield, and are probably better. In 1898 the Government factory department at Düsseldorf issued a special order in consequence of the prevalence of phthisis among the grinders. In the ten years, 1885-1895, 72.5 per cent of the deaths among knife grinders in the Solingen district were due to phthisis, against 35.3 per cent for the rest of the population over 14 years of age; and an official medical examination showed that out of 1,250 grinders only 85 were over 45 years old. These facts, which are all the special information I have on the subject, hardly warrant any conclusion without further details; and I notice that the death

rate from consumption in Solingen for 1901—namely, 3.1 per 1,000—although above the average for German towns, is exceeded elsewhere; for instance, by Breslau (3.4), Ludwigshafen (3.4), Treves (3.2), and Heidelberg (3.2). The average for the whole of Germany in 1892–1900 was 2.4. One is therefore rather surprised that the Solingen figures are no higher; the place is fairly healthy, in spite of the occupation, as the general yearly death rate—18 per 1,000—sufficiently proves. As I have said, however, the departmental authority issued a special order relating to the installation of grinding shops and the removal of dust. In the Henckels Works the arrangements are admirable. Great cleanliness is observed in the smallest details, light and ventilation are ample, extracting fans carry off the dust more efficiently than I have ever seen it done anywhere else, and everything tending to raise dust is carefully eliminated as far as possible; the driving straps and wheels are lodged in a gallery or passage between two shops, and therefore outside the room; the stones and emery wheels are protected by special and ingenious hoods. I believe that this is a model factory, and can not fairly be taken as an average sample, but I should like to have the opinion of Sheffield manufacturers upon it. I know their opinion of German cutlery, and it would surprise those complacent Englishmen who still think the word “German” is synonymous with “inferior.”

Cheap and inferior cutlery is turned out at Solingen, and not infrequently with the name Sheffield stamped on it; but they also produce goods of first-rate quality, and are able to compete with Sheffield on their merits. I should not venture to say so on my own judgment, but my authority for the statement is the highest. That they turn out very beautiful things can not be denied; I have seen exquisite specimens of damascened, inlaid, and other fancy work. The superior Solingen cutlery is not cheap; the material is the best Swedish steel, the same that Sheffield uses. An extraordinary thing about the cutlery trade is the almost incredible variety of knives made. At the Suffolk works in Sheffield, for instance, they have 10,000 different patterns on the books, and will be actually making 3,000 to order at the same time. I found just the same thing at Solingen; Henckels have 9,000 patterns for Germany alone. Every trade, every country, and even every district has its own knives; the Somerset plowboy wants a different knife from the Yorkshire plowboy, and new patterns are constantly coming out; the Suffolk works have averaged ten new patterns a week for two years. This is a trade which will not be standardized, and that is one reason why America has hitherto failed to compete. Let the fact be noted to the credit of European alertness and attention to the needs of the market.

The cutlers of Solingen are highly organized in all branches of the trade, though I do not find them down on the lists of any of the large trade federations. The employers also are organized, and there is a joint machinery for settling disputes and prices, similar to that of the Lancashire cotton spinners. Boys are usually taken as apprentices; this is looked after by the unions, who limit the number. Very few girls are employed. The appearance of the factory has set up the usual housing difficulty, which has been met by building societies. They borrow money from the Landesbank of the province, and the town guarantees 3 per cent interest. The houses built are of two kinds—(1) small houses for minor officials, (2) larger ones containing

four to six families of workmen. The average weekly rent is about 1s. 6d. [\$0.36] a room. Many of the work people in the district own their houses; and it is the custom of the place for them to keep a goat, the "poor man's cow." There are 14,000 goats in the Solingen district.

The population is mainly Evangelical, in the proportion of 3 to 1. Although a comparatively small place, the town has been educationally in advance of many of its larger neighbors, and adopted compulsory continuation schooling sixteen years ago. Solingen is one of the constituencies which went over to Social Democracy at the last election.

Vital statistics (1901).—Population, 45,300; births per 1,000, 34.9; deaths per 1,000, 18; excess of births, 16.9; deaths under 1 year, per 1,000, 5.9; suicides per 1,000, 0.18. Of the births 2.4 per cent were illegitimate.

Finance (1902).—Taxation, total, £52,300 [\$254,518]; per head, £1 12s. 7d. [\$7.89]; expenditure, total, £132,701 [\$645,789]; per head, £2 17s. 5d. [\$13.91].^a

Pauperism (1902).—Expenditure, total, £8,490 [\$41,317]; per head, 3s. 6d. [\$0.86].

Various statistics.—Police, 31; public houses, 328; churches, —?; theaters, none.

Seven towns have now been described in considerable detail. They have been selected in order to represent a number of different industries and to give a fair general idea of the conditions of life in some leading Prussian manufacturing communities. The list might be indefinitely extended, and in every town added some variations and peculiarities would be noted; but there would be a great deal more of mere repetition, and even if space permitted I do not think much would be gained by it. Anything like a comprehensive list is quite out of the question. The number of towns and villages engaged in manufactures is far too great to permit even of the scanty treatment of a gazetteer in detail. One must make a selection, and I have done so to the best of my judgment. The places described, however, although very varied, are all in one Government district, and I will therefore add a few notes on two important industrial centers a little farther off—Aachen and Dortmund.

AACHEN.

Aachen, better known to English readers as Aix, is the capital of the most westerly division of the Rhineland. It lies hard on the Belgian frontier and on the main line from Brussels to Cologne. It is separated from the manufacturing Rhine district of Düsseldorf by an extensive stretch of flat agricultural country, which gives way to hills and woods near Aachen.

The town itself lies on hilly ground and in the neighborhood of extensive coal fields. Of its famous historical past I need say nothing, except that the principal remains—the minster, townhall, central ring formation, and one or two old gates—give it considerable dignity and interest. The townhall is especially fine. Although the body of the building dates from the fourteenth century, it is more commanding

^a No change has been made in the Times figures. They have, however, been reduced to American equivalents. The taxation figures £52,300, reduced, yield \$254,518, but these divided by 45,300, the population, give only \$5.61 per capita, whereas the per capita figures of the correspondents are £1 12s. 7d., or \$7.89. The entire population may not have been entered on the tax data. This, however, should hardly have been allowed to interfere with a general average or estimate.

and impressive than the most ambitious modern townhall I have seen—which is, I should say, that of Philadelphia. It overlooks the market-place, which on market days presents a busy and characteristic scene. Covered markets are much less common in German than in English industrial towns; perhaps the more settled weather makes them less necessary, but the old-fashioned open-air booth markets are held regularly, as they have been for centuries. They form a picturesque element in the life of the people and have an attraction for housewives which the cooperative store wholly fails to replace. It is human nature, immemorial and unchanged among the people—that rock whereon economic theorists with their heads in the air are perpetually foundering.

As a modern town of medium size Aachen is well ordered and comely enough. Its waters still attract some 70,000 visitors annually, of whom 20 per cent are English. The population is about 136,000, overwhelmingly Catholic (about 12 to 1), and not growing so fast as that of most of the industrial centers previously described. The natives have a character for gaiety and humor; they vie with Cologne and Düsseldorf in the annual plunge into licensed insanity that lasts for three days at carnival time. For the rest of the year they are as industrious as their neighbors. As regards manufactures, Aachen is largely a woolen town; it spins and weaves and dyes woolen and worsted goods, and it supports a textile school especially devoted to those branches of manufacture. The present school was built in 1888–1890. It is divided into four departments—(1) weaving, (2) spinning, (3) finishing, (4) dyeing—and aims, like the Gladbach school, at providing practical experience on a commercial scale by manufacturing for the trade, for which it has the requisite installation. Its strong point is dyeing. The conditions of study are very much the same as those in the similar schools previously described, but the courses are somewhat shorter, and the fee for foreigners is only £40 (\$194.66) a year. Evening courses are given to foremen and workmen for 30s. and 10s. (\$7.30 and \$2.43) per annum, respectively. The present number of students is about 100, of whom 25 attend the evening courses. A unique feature is a course of instruction for women and girls in darning or making good defects in woven cloth. The school, which was originally started in 1883 by private enterprise, is still partly supported by the Aachener Association for the Promotion of Industry, a remarkable society which dates from 1825 and now possesses a capital of over £6,000,000 sterling \$29,199,000. Its revenues are devoted to the support of a large number of benevolent institutions and other public objects.

In addition to the wool industry, Aachen is famous for the manufacture of needles, a trade introduced in the sixteenth century from the Spanish Netherlands and so faithfully preserved and developed that the town has almost a monopoly of the home market and is a formidable competitor in the markets of the world. Some of the factories are quite inside the town, but the majority are on the outskirts. The textile mills number about 100, and employ some 15,000 workmen. Just outside the city are the famous Rothe Erde iron and steel works of the Aachener Hütten-Actien-Verein. The equipment for the production and manufacture of Bessemer and open-hearth steel is one of the most complete and modern in Europe. Aachen is the seat of the

only "technische Hochschule" in the whole of Rhineland and Westphalia, which seems somewhat singular, considering their preeminent industrial importance.

Vital statistics (1901).—Population, 136,300; births per 1,000, 34.6; deaths per 1,000, 20.2; excess of births, 14.4; deaths under 1 year, per 1,000, 7.4; suicides per 1,000, 0.10.

DORTMUND.

Dortmund is the commercial capital of Westphalia and a place of importance, though not the seat of a provincial government. It lies in the great coal basin which, as I have already pointed out, runs due east from the Rhine, where the river Ruhr joins it, and is the actual begetter of that remarkable chain of iron towns—Ruhrort, Duisburg, Oberhausen, Essen in the Rhine Province, and Bochum, Herdeke, Hörde, Dortmund, Hamm, and many others in Westphalia—that represent so large a share of modern Germany's wealth and industry. It is in this series of towns that the Social Democratic party obtained such a large accession of votes in the last election to the Reichstag. Nor is the reason far to seek, if the mere observer of social conditions, apart from politics, may be allowed to have an opinion. The population consists mainly of coal miners and iron workers; and these are the backbone of the trade unions which have been sedulously cultivated by the Social Democratic party for years. Further, it is just these industries that were most affected by the depression of trade which set in in 1900 and lasted until recently. Many were thrown out of work and a great many more were reduced to short time. At a large trade-union meeting of miners held last spring it was stated that the earnings of half the membership had fallen 73 per cent since 1900. The men were just in the humor to vote for a political party which promises them a great improvement in their condition, whether they believe in the promises or not. It stands for change of some sort.

Such is the region of which Dortmund is the center. The town is surrounded by coal mines, coke ovens, and ironworks, and is the terminus of the Dortmund-Ems Canal, a fine engineering, but not, I believe, a commercially successful, undertaking. The population, which has increased very rapidly of late years, now numbers about 146,000, of whom rather more than half belong to the Evangelical communion. The industrial development has taken place on the outskirts of the town. The central part is old and interesting, and of much the same type as Aachen—for Dortmund, too, has a history. It was a walled city from very ancient times, a Hansa town, and the seat of the mighty Fehmgericht. The old walls are now exchanged for wide boulevards, but I notice that towns of this class are generally less well provided with parks and open spaces than those with a less stirring past. Dortmund is officially important as the seat of the head post-office of the province, and it derives from this distinction the advantage of possessing a magnificent building. The State generally houses itself well in Prussia, and the post-offices are particularly handsome and solid structures; but the Dortmund head office is quite exceptional. I have nowhere seen anything of the kind so fine. There are some other good buildings, including a very interesting old guildhall and a similar restored townhall, no longer used.

Educationally the only point to be noted is a technical school of engineering. Like the other iron and coal towns, Dortmund has a very high birth rate. Here lies the assurance of Germany's strength—her abundance of children. Truly she has her quiver full of them. In the country coal districts the birth rates are still higher, and sometimes go up to 60 per 1,000. The conditions of life seem very good in the rural coal region about Dortmund. The colliers live in single cottages with gardens, very tidy and clean looking, and stretches of cultivated land separate each pit settlement from the next. The Westphalians are a race of great character, reminding one in some respects of the Yorkshire folk; they are very independent, reserved, self-willed, and conservative—a sturdy, vigorous stock.

Vital statistics (1901).—Population, 146,600; births per 1,000, 42.9; deaths per 1,000, 19.9; excess of births, 23; deaths under 1 year, per 1,000, 8.1; suicides per 1,000, 0.20. Of the births 4.5 were illegitimate.

6. SAXONY AND CHEMNITZ.

STRIKING FEATURES OF INDUSTRIAL SAXONY.

If the lower Rhine province may be called the Yorkshire of Germany, the Kingdom of Saxony is its Lancashire. The population is nearly the same—4,202,216 (1900)—and if not equally, at any rate chiefly, engaged in manufactures of a not dissimilar character, combined with a certain amount of mining. But in Saxony both the mining and the manufactures are more varied. Lancashire is virtually given up to cotton and coal; it spins, weaves, dyes, and prints cotton for all the world, and makes machinery for doing these things. If they are taken away what is left amounts to very little, for various other once flourishing industries—paper, glass, watches, and hats—are mostly decayed up to the point of extinction. Saxony is less dependent on a single article. Its mines produce silver, lead, copper, arsenic, bismuth, nickel, zinc, iron, and other things, besides coal, and its manufactures are very varied. Out of 550,000 work people, 185,000 are engaged in the manufacture of textiles, 81,500 in engineering and the construction of machinery, 35,500 in the preparation of metals, 30,000 in paper making, 36,000 in clothing manufacture, 51,000 in mining and quarrying, 7,000 in the production and smelting of ores, 6,000 in leather manufactures, and 5,000 in the production of chemicals. The textile branches alone show much diversity. They include the spinning and weaving of cotton, wool, worsted, jute, silk, and linen into a great number of articles—cloth of different kinds, ladies' dress materials, underclothing, men's neckties, furniture stuffs, carpets, curtains, thread—and the manufacture of lace, stockings, and gloves of cotton and silk. These, with the making of machinery for producing them, constitute the most important branches of manufacture. They are carried on in all the five districts into which the Kingdom is divided. It is a veritable hive of industry, more thickly populated than any other section of Germany or than any other European country.

The number of inhabitants to the square kilometer is 280; the little principality of Reuss (the elder), which adjoins Saxony and is of the same industrial character, comes next with 216, and then the Rhineland with 213 (though it should be noted that the density of the special industrial area of Rhine-Westphalia is much greater, reaching 1,639 at its highest point). England and Wales come just between these two with 215, and all three are a little behind Belgium, which has 229, and is the most densely populated country in Europe next to Saxony. The manufactures rather cluster round the larger towns, but are by no means confined to them. As in Lancashire and Yorkshire, they overflow, so to speak, into the smaller towns and villages, which in some districts form a continuous series of factory settlements, particularly along the rivers. It is, no doubt, largely due to the

excessive competition thus engendered that wages are so much lower here than in Prussia. The Saxons are a prolific race; from 1816 to 1900 they have maintained a higher mean rate of increase than any other section of the German people. They have had to work very hard to keep their place; over and over again in the history of their industries some staple branch on which they relied has been reduced by competition to an unremunerative level and has been given up. Theirs is no story of facile conquest and sudden industrial development, but of steady labor and unremitting effort. The Saxons are a brave, solid, industrious, and friendly folk. No one can help liking and respecting them.

CHEMNITZ.

The largest towns in Saxony are Leipzig (456,124), Dresden (396,146), and Chemnitz (206,913). The figures are from the census of 1900. The present population of Chemnitz is reckoned to be about 220,000. It is the most important manufacturing center in the kingdom, for Dresden and Leipzig, though the seats of extensive manufactures, are not primarily or principally industrial. The one is the capital and the seat of government, the other is the chief center of trade. But Chemnitz is of the pure industrial type and the largest single town of that type in Germany, though Barmen and Elberfeld, which actually form one community, exceed it together. Chemnitz is often called the Manchester of Saxony, and the inhabitants appear to take some pride in the nickname, but I do not think it very appropriate or very flattering. Manchester is essentially a trading center, not a manufacturing town, though it contains manufactories, and, however admirable the busy energy of its inhabitants may be, no one can call it pleasant to the eye. It has all the defects of a great city in an exceptional degree—the crowding, noise, vice, squalor, and grime—and they are not relieved by pleasant country surroundings, which is the happier case of the equally grimy and unlovely Sheffield or Leeds or Elberfeld.

Now, Chemnitz bears no resemblance at all to Manchester. It has neither the defects nor the merits of that great roaring mart, with its wealth, bustle, and power, but is a clean, rather quiet place, not devoid of picturesqueness. Its heart is a ring, once walled and towered; and a ring has always the flavor of a romantic past, though hardly a trace of the fortification remains. Chemnitz is an ancient place, with a history very much like that of several towns already described. It began with a religious foundation in the Middle Ages, became a market town and trading center, secured independence and self-government for a time, but went through the usual vicissitudes incidental to the quarrels or bargains of overlords. Of course, the Thirty Years' war, which figures somewhat monotonously in the history of all the larger German towns, did not spare a walled city lying on the high roads from Prague and Nuremberg to Leipzig and the north. In spite of all the regular visitations, however, Chemnitz continued to maintain and increase an industrial position first gained in the fourteenth century, very much as Elberfeld gained hers, by securing a monopoly of the right to bleach the linen produced in the neighboring villages; but, unlike Elberfeld, it has not destroyed the river to which it owes the origin of its prosperity and importance. The little Chemnitz still flows bright and clear through the town, and adds in no small measure to its attractiveness.

As the industries and the population increased during the last century new streets were thrown out in all directions in an ever-lengthening radius from the central ring. They are tidy streets of an unpretending character, with quite good shops. There is something homely and friendly about the whole place. The factories are not hidden away in the background, but are everywhere, and very much in the foreground; yet they are singularly inoffensive. The atmosphere is clear and the buildings unblackened. The ground is varied, rising steeply to the Kassberg on the western side of the river, which flows due north through the heart of the town. The open spaces, market places, parks, and so on are unusually abundant and attractive. One of these is connected with the Schloss, which is really the old Benedictine abbey, and now belongs to the city. Few towns, industrial or other, have such a charming playground so close at hand. There is a large sheet of water with an island, flower gardens, and walks overlooked by the Schloss, and on higher ground at the back an extensive and wooded park. Another fine open space quite in the town is the Schiller-Platz, with a large market place adjoining. Between them stands, conspicuous and imposing, one of the numerous modern churches which testify to the piety of Protestant Saxony, and are not less striking than those of the Catholic Rhineland noted above. This church was built in 1888; it has a lofty spire, and high up a clock dial illuminated at night, a welcome landmark to the stranger uncertain of his way. I owe no little gratitude to that church. Some other buildings on the Schiller-Platz are worth noting, as signs of the industrial character of the place. At one end is the largest cotton mill in Saxony.

Chemnitz is the headquarters of cotton spinning; the first rude machine was set up there in 1782, and many efforts were made to improve it, as the spinners found it impossible to obtain the superior machines of England and France. In those days the secrets of machinery appear to have been much more jealously guarded than they are now. One country would not allow its inventions to go to another, nor were foreign workmen or students allowed in the shops where such things were made. It was not until the nineteenth century that cotton-spinning machines were brought into Saxony from England and France. There was the same trouble with wool combing and spinning. The secret of the English machinery was first brought into Germany by a Thuringian manufacturer, who went to England disguised as a journeyman carpenter to learn it. In this capacity he was able to study the construction, and on his return he built himself a machine; but he also kept it to himself. The Saxon manufacturers failed to learn the secret until about 1820, when they obtained machines from France. To this day spinners and combers are the most jealous of all manufacturers, except chemists, and many of them will not allow their dearest friends to enter their mills. Such exclusiveness is quite as common in England as in Germany, but the trade in machinery is no longer kept close. Indeed, the prosperity of Lancashire and Yorkshire has for many years largely depended on the exportation of textile machinery; and the increasing independence of Germany in this respect is one of the most significant signs of her increasing industrial efficiency.

No town has contributed more to that independence than Chemnitz. Its pride lies in the production of machinery and tools even more than in the textile branches of manufacture. Some large works make it in

certain lines the most important center for machinery in Germany. The Sächsische Maschinen Fabrik and the Chemnitzer Werkzeug Maschinen (machine tools) Fabrik are known all over the world, and will be better known, unless I am much mistaken. The workshops of Manchester, Oldham, Keighley, and other machinery centers have no more formidable competitors in the markets of the world. The rise of the Sächsische Maschinen Fabrik is a worthy counterpart to the story of Krupps. The beginning of machine building in Chemnitz dates from 1826, and the pioneer was a man named Haubold. He built the first steam engine in 1829, and to his workshop came one day a young mechanic named Richard Hartmann, in search of work. Hartmann was born in Elsass in 1809, and was not only an uncommonly good workman but something of a genius. He got work at once at Haubold's; but after a few years, having ideas in his head, he started a little workshop on his own account with three journeymen. That was in 1837. In 1841 he had got on so well that he moved into larger premises, where he employed 76 men, and the same year he delivered his first steam engine. He then built himself a new factory and added locomotives to his output. The first was delivered in 1848. He next went on to build looms for the local industries, and in 1854 he set up his own foundry. This was about the time when the tide of fortune turned for Alfred Krupp and began to flow steadily onward. Hartmann appears to have never looked back. He went on from one branch of engineering to another, adding machinery for mining, milling, all kinds of textile work and other manufactures, besides machine tools.

In 1870 he sold the works to a company for nearly half a million sterling, but retained his connection with the concern, which continued to prosper and is still better known by his name than by that of the company which it bears. At the present time, when in full work, it gives employment to about 5,000 men, and turns out all kinds of engines, locomotives, locomobiles, boilers, turbines, cranes, hammers, rails, tires, rolling mills, machinery for mining, for saw and flour mills, for manufacturing paper, guns, torpedoes, and every kind of textiles. They manufacture very largely for the export market and send their goods all over the world. This is not altogether the "dumping" of surplus production, for it has been going on very steadily for many years. Between 1880 and 1890 the foreign orders amounted to nearly one-third of the whole. Dumping is a blessed word, but Englishmen will be well advised not to trust too much to its consolations. We have done a good deal of dumping of our own in our time, and then it was called legitimate trade; but we do uncommonly little now in Chemnitz. The workshops of the Sächsische Maschinen Fabrik contain a number of the beautiful gear-cutting and screw-making machine tools made by Brown & Sharpe, of Providence, but only one solitary English machine, and that an old one. The works cover a great deal of ground, and the shops are admirable, well lighted, orderly, and beautifully clean. A large new foundry, recently built, is a model. The only foundry I have seen equal to it is, oddly enough, that of Brown & Sharpe, but the latter is on a much smaller scale.

Among the other prominent industries of the town are hosiery and gloves, chiefly of cotton. Chemnitz is the headquarters of both trades, and among the firms which carry them on is an English house, the

Nottingham Manufacturing Company, which has mills also at Leicester and Loughborough, I believe. The knitting machines are still chiefly English, and England is one of the chief markets for the goods. The United States used to be a great customer, and still is to some extent; but the trade, which underwent a great expansion about twenty years ago, has been hard hit, like many another, by the Dingley tariff. The yarn is chiefly spun in Chemnitz and the neighborhood. The work people employed in the knitting mills are mostly girls and women, who make about 10s. [\$2.40] a week. The employment is not arduous and seems to be healthy; the rooms are comfortable, well ventilated, well lighted, and warmed in winter; and the girls look very well and strong.

The weaving industry in Chemnitz has gone through many vicissitudes, and is not so important as it used to be. At one time calico was one of the staple products of the town, but after 1840 the trade in it declined, and colored cotton goods, particularly ginghams, took its place. These in turn were forced out of the market by excessive competition, which depressed wages below a living standard and compelled weavers to turn to something else. They then took up wool and mixed goods of wool and cotton or silk, for dress materials and neckties in particular. To these were added furniture stuffs—tablecloths and curtains—woven in patterns on jacquard looms, which had been introduced into Saxony in 1827. The latter trade increased and flourished, as did the half-silk goods, but the neckties yielded to the vicissitudes of fashion, and in half-wool dress materials Chemnitz was beaten by its neighbors, Glauchau and Meerane, which are now the chief centers for those articles. Another branch of textiles on which the Chemnitz weavers have tried their hands with more lasting success is parasol and umbrella cloth.

Vital statistics of Chemnitz, 1901.—Population, 208,500; births per 1,000, 38.3; deaths per 1,000, 24; excess of births, 14.3; deaths under 1 year, per 1,000, 13.2; suicides per 1,000, 0.32. Of the births, 12.1 per cent were illegitimate.

OTHER SAXON TOWNS.

I have just mentioned Glauchau and Meerane, and may as well take this opportunity to say a word about some of the more important industrial towns of Saxony outside of Chemnitz. They are very numerous, as I have already said, and their products tend to run in the same general lines, but with special developments.

Glauchau is a town of about 26,000 inhabitants, in the Chemnitz district, and is one of the oldest seats of the textile industry in Germany. Cloth weaving is mentioned in 1422 and linen in the following century; cotton manufactures were introduced in 1713. The principal trade is now in superior dress materials for ladies. All the processes are carried on here—combing and spinning, weaving, dyeing, and printing. Basket making is another local industry.

Meerane is also a wool town, not far from Glauchau, and about the same size (24,000). In addition to dress materials, they make underclothing and carpets. Last winter the weavers came out on strike for three months, and in the end obtained an increase of wages.

Zwickau is the center of an administrative county, and a place of

somewhat more importance, with 56,000 inhabitants. In addition to textile manufactures of wool, half-wool, and cotton, it has a good many metal and chemical industries—lead, copper, quicksilver, alloys of copper, zinc, and nickel, nails, wire ropes, and lacquer, as well as glass and porcelain. There are numerous coal mines in the district.

Plauen (74,000), in the Zwickau county, is, next to Chemnitz, the largest of the purely industrial towns of Saxony. It is the center of an important textile district, particularly for worsted, the headquarters of which, in Saxony, are at Reichenbach (25,000), about halfway between Plauen and Zwickau. In Plauen they also make thread, lace, carpets, cotton and mixed dress goods. At Olsnitz (14,000), in the same neighborhood, the manufacture of Axminster carpets is a specialty.

Freiberg (30,000) lies between Chemnitz and Dresden, and is distinguished as an educational center. It is the seat of one of the two special high schools of mining in Germany; the other is at Klausthal. The industries carried on at Freiberg are chiefly engineering, metal working, and the manufacture of chemicals.

Bautzen (26,000) lies quite in a different direction, in the northeast corner of Saxony, near the Silesian border. Besides cotton, wool, hosiery, and machinery, it produces a specialty in the form of musical instruments.

Meissen (20,000), near Dresden, deserves mention as a pottery town. The Royal works, where Dresden china is made, are here, as well as other pottery establishments.

It will be seen, even from this selected list, that the manufactures of Saxony are much scattered about in small towns, but the places mentioned are the more important centers, and only a fraction of the total number. They are all surrounded and interspersed by lesser ones. In Saxony, indeed, the idea of having the manufactures in the country rather than in the town is to a large extent realized, and this does something to relieve the urban overcrowding, which is still more marked than in the Rhineland; but the lack of housing is so great that overcrowding extends to the villages. The average number of households to each inhabited dwelling in the villages of Saxony is 2, and the average number of persons to a dwelling is 8.85. In the manufacturing counties of Zwickau and Chemnitz the number of households per house rises to 2.17 and 2.45, respectively, and the number of persons to 10.01 and 10.67. That is in the villages alone. It is partly due to the fact that in the larger towns many of the factory hands either can not find lodgings at all—cottages are not to be thought of—or can not pay the rents, which amounts to the same, and consequently they live in the surrounding villages. This is particularly the case with Chemnitz, and the practice is facilitated by the electric trams. The work people travel in and out every day a distance of an hour or even two hours' journey. Thus it happens that in the villages around Chemnitz the average number of households is 2.94, and of persons 12.77, to a house. Near Dresden and Leipzig the figures are still higher. Of the towns, Chemnitz itself is the most overcrowded. Tenement life is universal; the average number of households is 6.87, and of persons 29.16, to a house. In the most densely populated parts the number of persons to a single house runs from 130 to 173.

Saxony returns 23 members to the Reichstag. In 1898 11 were Social Democrats; at the last election the 11 became 22. Berlin itself is not more solid.

INFANTILE MORTALITY IN SAXONY.

It is not surprising therefore to find a high death rate, and particularly a high infantile death rate. In Chemnitz the latter is enormous, and needs some further explanation. The town may fairly be compared with Elberfeld, which also suffers from overcrowding; but in 1901 the general death rate in Elberfeld was 17.2 per 1,000 living, and the infantile (under 1 year) rate was 5.7; the corresponding figures for Chemnitz were 23.9 and 13.2. Far more than half the deaths occurred under 1 year. Of the total number of children born, 34.37 per cent died under 1 year. In fact, if the infantile deaths be deducted, the general death rate is low. The subject is discussed at some length by the medical officer in his annual report. It appears that no epidemic fever accounts for the fact; nine-tenths of the deaths were ascribed to "gastric and intestinal catarrh and atrophy," otherwise inflammation of the digestive tract and malnutrition. The causes he suggests are lack of medical advice (a doctor was called in only 8.1 per cent of the cases), bad housing, overcrowding, bad feeding, and dirty feeding bottles. No doubt these are all effective causes, but they are not peculiar to Chemnitz or to Saxony, and they do not go to the root of the matter. An examination of the infant mortality over a wider area reveals several facts: (1) It is excessive throughout Saxony as a whole; (2) but far higher in the textile districts than in the others. Zwickau is nearly as bad as Chemnitz.

In 1900 the number of infantile deaths was, in Zwickau, 33 per cent of the number of children born; in the town of Chemnitz, 36 per cent, and in the district of Chemnitz, 40 per cent; whereas in Leipzig it was 24, in Freiberg 23, in Dresden 20 per cent, and in other parts still less. If we further compare the textile districts in Prussia we find two things, a lower infantile mortality and a lower birth rate. If we go still further and compare the English textile towns we find both again lower, but the birth rate very much lower. These facts bring us face to face with one of the most profound and important problems of civilization. The higher infantile mortality in Saxony can not be attributed to inferior education, for that kingdom, which has for years made continuation schools general and compulsory, is distinctly ahead. The real explanation I believe to be this: In Saxony wages are low and the people have never learned to enjoy and look for a high standard of comfort. They still take life as it comes, and it comes with many children. Some of these are weak, and the parents let them die. The fact that a doctor is not called is most significant of their attitude. They take death as it comes, too; it is part of life. And more children succumb in a textile than in other districts, because the mothers go out to work. This may seem very sad and shocking, but the alternatives are worse. I can not discuss the subject further here; but I have drawn attention to it in connection with Saxony because that country presents us with an example of the more natural way of life, which is becoming rare. Nature's way is to produce a large surplus and by eliminating the weak at the beginning of life and selecting the strong to make the race vigorous. Many people think they know a more excellent way, but they may be mistaken.

RELIGION AND MORALITY.

The population of Saxony is overwhelmingly Protestant. The Roman Catholics amount to only 4.7 per cent, though they have

greatly increased in recent years, having nearly trebled since 1880. The number of Jews is very small. As is everywhere the case in Germany, illegitimate births and suicides are more numerous than in the Roman Catholic districts. The following figures show this:

Illegitimate births and suicides in Germany.

	Illegitimate births per 100 (1900).	Suicides per 100,000 in- habitants (1898-1900).
Saxony	12.6	30
Rhineland	4	11
Westphalia	2.7	10
German Empire.....	8.7	20

To prevent erroneous conclusions from being drawn concerning the influence of work and wages on illegitimacy and suicide it should be added that both are lower in the purely industrial towns of Chemnitz and Zwickau than in Dresden and Leipzig.

7. FACTORY CONDITIONS.

CHARACTER OF GOVERNMENTAL CONTROL.

The State recognizes the duty and exercises the right of regulating factories in the interest of the employed, but in doing so it is careful to keep in view the equal duty of fostering national industries, and consequently the German law is in many respects much less stringent than the English, which seems to have been passed under spasmodic influences, without conscious recognition of any principle. At bottom the difference, no doubt, is that in Germany it has been necessary to cultivate industries with great care. Consequently, the legislature has been forced to strike a balance, with its eyes open, between two claims—that of the employed for protection and that of the community at large for the promotion of industrial enterprise; whereas in England the necessity for encouraging manufactures has hitherto not arisen, and the legislature has merely from time to time taken up the duty of protecting the employed with such drag upon its actions as the private interests of employers have been able to effect. The protection has, in short, been all on one side. The time when this line could be pursued with safety has now passed. Our manufacturing industries have come to such a delicate balance that the possibility of their toppling over must be taken into account, and consequently the interest of the community is concerned in any course which is likely to have that effect. If they do not require special cultivation for their encouragement—which is an arguable point—they certainly do require protection from serious shocks. It is therefore instructive to note the manner in which the balance has been struck in Germany and to observe the results. The following remarks must be taken to apply to factories in the ordinary sense of that word as used in England.

EMPLOYMENT OF WOMEN AND CHILDREN.

The most stringent regulations are those affecting children and women; and herein the State clearly has in view the interests of the community as represented by the employed.

Children.—Children may not be employed under the age of 13, and at that age only if they are no longer liable to attend school, a condition which is decided by the school inspector. For such children—that is, those from 13 to 14 years old—the hours are limited to six a day, with half an hour's interval for meals. In 1901 the total number of children under 14 employed throughout the Empire in Fabriken, which includes a good deal more than factories in the English sense, was 9,454 (5,876 boys and 3,578 girls). Of these 25.3 per cent were employed in textile industry, and this accounted for nearly half the girls; 16.3 per cent (mostly boys) in the "stones and earth" industry; 15.1 per cent in the industry of "food and drink;" 11.5 per cent (chiefly boys) in the metal trades; 7.3 per cent (chiefly boys) in woodworking; 6.9 per cent (nearly

all boys) in the machinery industry. In the other trades the numbers were very small. The home employment of younger children was brought under regulation by an act passed last March, but the details do not concern us.

After 14, children are exempt from school, except in so far as boys may be liable to attend continuation classes for a few hours a week in those places where continuation schools are compulsory. At 14, therefore, boys and girls may and do go into the factory in large numbers; but up to 16 they are called "young persons" or (together with those under 14) "youthful workers," and are subject to special regulations. The number of "young persons" employed in 1901 was 335,912. They may not be employed for more than ten hours a day, nor on Sundays and holidays, nor during the hours appointed for religious instruction, for confirmation, confession, and communion, nor in certain specified trades; their working day must not begin earlier than 5.30 a. m. nor continue later than 8.30 p. m.; they must have an hour's pause at mid-day and half an hour both in the forenoon and in the afternoon, unless their working day is not more than eight hours, and no continuous spell exceeds four hours. During the pauses any participation in the work of the factory is forbidden, and even to remain in the rooms is allowed only when their own department of the work is brought to a complete standstill or it is impossible for them to go elsewhere. These regulations apply to both girls and boys under 16; after that they cease to be "youthful workers." After 18, boys, other than regular apprentices, are under no special protection, except that all minors (under 21) must be provided with a "work book" or register containing name, age, birthplace, nature of employment, date of engagement, discharge, and other particulars. In some employments wage books may also be made compulsory; details of wages and other conditions are entered in these books. In some parts of Germany attendance at continuation schools is compulsory from 14 to 16, 17, or 18 years of age; employers must grant leave of absence for the required school hours to boys so liable.

Women.—Female hands must not be employed between 8.30 p. m. and 5.30 a. m.; on Saturday and on the eve of a holy day they must not be employed after 5.30 p. m. Their daily hours of employment must not exceed eleven on ordinary days or ten on Saturday and on the eve of a holy day. They must have at least an hour's pause at midday, and those who have a household to look after may claim an extra half hour. Employment is forbidden to mothers for four weeks after confinement, and for a further fortnight unless they have a doctor's certificate. The number of women over 16 employed in 1901 was 847,386, of whom 310,211 were under 21.

Wherever women and youthful workers are employed in a factory the employer must give written notice to the police, stating the nature of the employment and the hours of work.

The foregoing regulations are of general application. There are, in addition, special rules for the protection of women and youthful workers in the following manufactures: Matches, lead, horsehair, brushes, cigars, accumulators, zinc, glass, rubber, spinning and some preparatory textile processes, basic slag, preserves, chicory, sugar, milk, metal rolling and forging, and pottery.

With the exception of the age limit for children, which is one year later in Germany, and the provision for granting time to attend con-

tinuation classes, these regulations are less onerous and less rigid than the corresponding ones in England.

GENERAL REGULATIONS.

Holidays.—The following holidays are secured: Sunday, New Year's Day, Easter Monday, Ascension Day, Whit Monday, Repentance Day (middle of November), Christmas Day, and the day after. Good Friday is also generally observed, and in places where the population is preponderatingly Catholic, as in the Rhine Province, several additional holidays are kept on important church festivals. The statutory time allowed on these holidays is, each Sunday and festival day not less than twenty-four hours; if two come consecutively, thirty-six hours; Christmas, Easter, and Whitsuntide, forty-eight hours; the time is reckoned from 12 o'clock midnight. It appears, therefore, that factory hands are fairly well off for holidays.

Payment of wages—fines.—Truck is forbidden; wages must be paid in currency, and not on Sunday. Fines are permitted, but must not exceed half the average earnings, except in case of acts against fellow-workmen, of offenses against morality, or against regulations for the maintenance of order and of security, and for the fulfillment of statutory provisions. In these cases fines may be imposed to the full extent of the average earnings. All fines must be applied to the benefit of the factory workers, and generally go to the sick fund; but this does not affect the right of the employer to obtain compensation for damage. Particulars of fines must be entered in a book, which is open to inspection by a Government officer.

FACTORY RULES.

Every factory must have a set of rules hung up in an accessible place in each department, stating the hours of work, with the regular intervals for meals, the time and manner of paying wages, the length of notice required for terminating employment and the conditions which render notice unnecessary, and particulars of punishments, including fines and the objects to which they will be applied. Punishments which wound self-respect or offend against morality are inadmissible. The factory rules are legally binding on employer and employed; but before they are issued opportunity must be given to adult workers to express their views, and the rules, with any written objections, must be submitted within three days of issue to the factory inspector, who may order amendments if the rules are not in accordance with the law or with special regulations. Punishments not in the rules can not be imposed, nor can other grounds of dismissal be included in the contract.

Notice of termination of employment is usually a fortnight, but it may be dispensed with on the part of an employer on the following grounds: False representations; theft and other criminal acts; leaving work without permission or refusing to fulfill the contract; carrying fire or lights about contrary to orders; acts of violence or gross abuse directed against employer, his representative, or family; willful damage; inducing members of employer's family or his representative or fellow-workers to behave in a manner contrary to law or morality; inability to continue work, or an alarming disease. Similarly it may be dispensed with by workers on corresponding grounds, and also for

nonpayment of wages in the prescribed manner, neglect to provide sufficient work for pieceworkers, unjustifiable prejudice, danger to life and health in the employment which could not be inferred from the contract.

The provision of factory rules containing the foregoing and other particulars, legally binding on employers and employed, is a characteristically German institution. It is in accordance with that respect for law and order which is such a marked feature of German life, and contributes materially, I have no doubt, to the smooth working of the establishment. The relations, rights, and obligations of work giver and work taker—to use the excellent German terms—are publicly defined and guaranteed by the law. This conduces to tranquillity, and renders vague talk about “rights” palpably futile. The law can not be changed by individual bullying on either side. The rate of wages is, of course, not included in the factory rules.

FACTORY PREMISES.

Before any standing industry can be started it is necessary to give notice to the local authority; and special permission is required for certain concerns which may give rise to a public nuisance or danger. These include the manufacture of explosives, gas, petroleum, coke, coal tar, bricks, chemicals of all kinds, soap, cellulose, and the like, and a number of other establishments, such as blast furnaces, foundries, forges, tinning, and galvanizing works. Similar permission is required for the erection of boilers, and specially noisy works may be forbidden near churches, public buildings, and hospitals. Apart from these particular provisions, factories are subject to the following general law:

Owners are bound to arrange and maintain workrooms, appliances, machinery, and tools and to regulate the working in such a way as to protect the workers from dangers to life and health, so far as the nature of the business allows.

In particular, attention must be paid to the provision of sufficient light, ample air space, and ventilation, and to the removal of dust arising from the work, of vapors and gases thereby developed, and of refuse incidental to it.

Similarly, those arrangements must be provided which are necessary for the protection of workers against dangerous contact with machinery or parts of machinery, or against other dangers lying in the nature of the work place or the working, and particularly against the dangers which might arise from fire.

Finally, such rules must be issued with regard to the regulation of the business and the conduct of the workers as are called for to secure freedom from danger.

This section is followed by a similar one in general terms requiring the provision of arrangements for the preservation of morality and decency. It mentions the separation of the sexes, particularly in reference to washing and cloak rooms, and lays stress on the provision of adequate sanitary conveniences.

Further, in places where persons under 18 are employed, employers are bound to make such special arrangements with regard to health and morality as their age requires.

These general provisions of the law may be amplified by the local factory authority, which has power to order specific measures for their fulfillment in the case of individual factories.

DANGEROUS TRADES.

Special regulations for the efficient enforcement of the foregoing general ones may be issued for particular industries by the Bundesrath

(Federal Council of the Empire) or by the separate governments or by the police. A number of trades have been so regulated, largely in the interests of women and youthful workers, as already detailed. The trades and establishments specially regulated on general grounds are (1) for the Empire: Flour mills, match factories, bakeries, cigar factories, printing works and type foundries, zinc works, lead, color, and sugar of lead works, accumulators of lead and lead compounds, bichromates, basic slag mills, horsehair spinning, bristle and hair dressing, brush making; (2) for Prussia only: Spinning, mirror silvering, acetylene making. There is no system of notifying cases of trade poisoning or disease. Compensation for injury will be discussed under the heading of Insurance.

INSPECTORS.

The supervision of factories is intrusted to special inspectors, as in England. They are locally distributed in industrial districts, and reside near their work. It is their duty to visit factories and see that the provisions of the law are carried out. Factories in which women and youthful workers are employed must, in Prussia, be visited once every six months. A few female inspectors have been appointed in recent years for certain localities. The immediate superiors of the inspectors are special councilors attached to the provincial government offices. The official head of the department for the Empire is the German minister of the interior; for Prussia it is the minister of commerce.

SPIRIT OF THE LAW.

The foregoing sketch of the law will give a fair idea of the responsibility assumed by the State in regard to factory conditions. The duty of protecting "life, health, and morality" is fully recognized. On the other hand, the care taken to avoid interference which would seriously hamper industrial enterprise could only be shown by entering much more fully into detail; but some things may be pointed out. In the first place, trade requirements are recognized by numerous exceptions, especially with regard to Sunday labor and the hours for women. Here the legislature carefully discriminates between cases in which absolute prohibition can safely be maintained and those in which relaxation is expedient. In the second place, the same principle of elasticity is observed in the important general rules quoted above. The detailed application is left to the discretion of the local executive, which has to keep this object in view, but may vary the means according to the circumstances of the individual case. Even in the explicit rules for special trades there is a marked avoidance of those minute hard and fast directions which figure so largely in the corresponding English regulations and are apt to hamper the business without benefiting the work people, yet the essential requirements are as carefully secured, and in some cases in much greater detail. In the third place, there are significant omissions in the German code. We have, for instance, in England a series of minute regulations for cotton-cloth factories, in which artificial humidity is used, so drastic in character that if fully carried out they would render it exceedingly difficult, if not impossible, to carry on cotton weaving at all. Some of the provisions are in practice left in abeyance, but they are hung over the heads of manufac-

turers in a vexatious and discouraging way. Now, in Germany the cotton industry is entirely carried on with the aid of artificial humidity, and no interference with the process is attempted. The reason, doubtless, is that this branch of manufacture requires every encouragement, and the authorities deliberately refrain from hampering the enterprise. My object in making these comparisons is not to pass judgment on either code, but to illustrate the spirit in which the German legislature performs its duty.

ACTUAL CONDITIONS.

The proof of the pudding, however, is in the eating, and the test of a law is its execution. What are the actual conditions in German factories?

As regards health and comfort and efficient working I can only say that, speaking generally, they are excellent. The German best is no better than our best. Indeed, I have neither seen nor heard of anything quite equal in some respects to the best of the great Bradford mills, and we have many recently built factories and works of various kinds which can not be surpassed. On the other hand, we have naturally a larger proportion of old establishments than a country whose industrial development is so much younger, and though they have their old, dark, and dilapidated buildings, I have not discovered any so bad as our worst. I should say that the German average reaches a higher standard than our own. The buildings are generally of brick, sometimes white, but more often red, as in England; stone is exceptional. In the most modern steel is largely used. The floors are sound, dry, and clean. The rooms are lofty, amply provided with window space, and generally lighted from the roof also. The practice of having several stories one above the other is rare except in textile mills, and then the number of stories seldom exceeds three. I have never seen what is so common in the United States—namely, a weaving shed on the ground floor with other rooms above it, and the shed consequently pitch dark. The Germans appear to have grasped the fact that work is better done in a good than in a bad light, and great care is taken to secure it. Ventilation is also well managed; I find a monotonous entry, "Good light and air," in my notes.

But the most striking feature of German factories is their clean, orderly, and well-kept condition. These qualities seem to be universal, and they extend to the dirtiest and most untidy departments. The foundry is the severest test. It is usually a scene of dirt and disorder, unmitigated by any attempt to be tidy, and aggravated by an atmosphere heavy with smoke and gloom. The German foundries were a revelation to me. They are as clean and well kept and almost as light as any other shop. The remarkable order maintained is systematic, and in a large measure intended to promote the prevention of accidents. In the accident-prevention rules of the Rhine-Westphalian Engineering and Small Iron Industries Association I find it laid down in the first paragraph that—

The gangways in all workrooms must be broad enough to exclude as far as possible injury to persons using them by machinery or transmission parts in motion. They must be kept in good condition, and must not be blocked by the heaping of material or the transportation of articles.

That is exactly what happens in most of our engineering shops. There is no room. The place is congested, and manufactured or half

manufactured articles lie promiscuously about in all directions, blocking the fairway. The entire freedom from such disorderliness in German shops and workrooms undoubtedly conduces to efficiency as well as to safety; and it is secured chiefly through the habits of order inculcated into all alike—workmen, managers, and owners—by the military discipline they have all alike undergone. Fencing of machinery, however, is less complete and costly than that which is required in most factory districts in England.

With regard to the installation of machinery and workshop appliances, I can only say that German establishments are, generally speaking, quite up to the mark. They make use of electric power, automatic tools, and similar modern devices to as great an extent as anyone else. There is no hesitation in introducing innovations and no opposition on the part of the work people. Machinery and tools are procured from any country without regard to any consideration but suitability; but Germany is year by year becoming more self-sufficing in this respect. Their small tools are as good as the American, their heavy ones as the English; and their textile machinery is rapidly becoming equal to all requirements.

Outside the rooms German factories are well provided with sanitary, washing, and dressing accommodation. The workmen, I have remarked before, are more cleanly and careful in their habits than our own; they generally keep a working suit of clothes, and change before and after work. Consequently, lockers are provided. Baths are common, particularly shower baths with hot and cold water, and in summer they are much used. German employers certainly do a good deal more for their people than ours; or rather, I should say that the practice of providing comforts and conveniences for them is commoner in Germany. I have already said a good deal in the descriptive articles about housing provided by employers, and shall have to return to it; but apart from this and from sick funds and savings banks—another separate subject—it is common to find a number of things done for the people. They have dining rooms, for instance, with or without canteens. As a rule the people prefer to bring their own food and have it heated up. We have the same thing in England, but less often. Then, there are further developments. The dining room has probably a library and a piano; it is used for meetings, games, and choir practices. So we go on to the full-fledged model factory.

THE WORK PEOPLE.

This will, perhaps, be the best place to say a word with regard to the demeanor of the work people in the factory. German workmen are good, steady, regular, and trustworthy. They are not quick or particularly intelligent. I am sure they are not more intelligent than our own, and I rather suspect they are less so; but they do what they are told, and do it well. I have seen mechanics working on an engineering order from England and using the original drawing with the English measures. The foreman on being asked if it would be necessary to turn them into metric values said, "Oh, no; the men will work from the English figures all right." Now, would or could English mechanics do the same? The German workmen are not in the least inventive; they never make suggestions, nor is there any system of encouraging them to do so, but they keep the rules and do not shirk.

In short, they do what they are told, and do it well. Herein is a second cause of strength to German industry.

HOURS.

Roughly speaking, the working hours are ten a day. Where women are employed they are somewhat less on Saturday, because the law prohibits the employment of women after 5.30 p. m. on Saturdays and on the eve of a holiday.

The following time schedules, taken from various representative factories in different places, will show exactly the length and distribution of the day's work:

Hours in silk mill at Orefeld.

SUMMER.		WINTER.	
Begin	7 a. m.	Begin	7.30 a. m.
Breakfast	8.50 to 8.45 a. m.	Dinner	12 to 1.30 p. m.
Dinner	12 to 1.30 p. m.	Tea	4 to 4.15 p. m.
Tea	4 to 4.15 p. m.	Close	7.15 p. m.
Close	7 p. m.		

Total in summer, 12 hours, minus 2 hours for meals equals 10 hours.

Total in winter, 11½ hours, minus 1¾ hours for meals equals 10 hours. On Saturdays the closing time is 5.30 p. m. The week is, therefore, 58½ hours in summer and 58¼ hours in winter.

Hours in engineering works at Düsseldorf.

Begin	6.30 a. m.
Breakfast	8.15 to 8.30 a. m.
Dinner	12 to 1.30 p. m.
Tea	4.15 to 4.30 p. m.
Close	6.30 p. m.

Total, 12 hours, minus 2 hours for meals equals 10 hours. Week, 60 hours.

Hours in machinery works at Düsseldorf.

Begin	7 a. m.
Dinner	12 to 1.30 p. m.
Close	6.30 p. m.

Total, 11½ hours, minus 1½ hours for meals equals 10 hours. Week, 60 hours.

Hours in hosiery mill at Chemnitz.

Begin	6 a. m. (winter 7 a. m.).
Breakfast	8.30 to 8.50 a. m.
Dinner	12 to 1 p. m.
Tea	4 to 4.20 p. m.
Close	6 p. m. (winter 7 p. m.).

Total, 12 hours, minus 1 hour and 40 minutes for meals equals 10 hours and 20 minutes. On Saturdays the mill closes at 5.30 p. m. Week, 61½ hours in summer, 60½ hours in winter.

Hours in cotton mill at München-Gladbach.

Begin	7 a. m.
Dinner	12 to 1.30 p. m.
Tea	4 to 4.15 p. m.
Close	6.30 p. m.

Total, 11½ hours, minus 1¾ hours for meals equals 9¾ hours. On Saturdays close at 5.30 p. m. Week, 57½ hours.

Hours in woolen mill at Elberfeld.

Begin	6 a. m.
Breakfast	8 to 8.15 a. m.
Dinner	12 to 1 p. m.
Tea	4 to 4.15 p. m.
Close	6.30 p. m.

Total, 12½ hours, minus 1½ hours for meals equals 11 hours. On Saturdays close at 2 p. m. Week, 62 hours.

Hours in cutlery works at Solingen.

Begin	7 a. m.
Breakfast	9 to 9.15 a. m. (youthful workers 9 to 9.30).
Dinner	12 to 1.30 p. m.
Tea	4 to 4.15 p. m. (youthful workers 4 to 4.30).
Close	7 p. m.

Total, 12 hours, minus 2 hours for meals equals 10 hours. Week, 60 hours for men, 58½ hours for women.

Hours in engineering works at Chemnitz.

Begin	6 a. m. (winter 7 a. m.).
Breakfast	8 to 8.30 a. m.
Dinner	12 to 1 p. m.
Tea	4 to 4.15 p. m.
Close	6 p. m. (winter 7 p. m.).

Total, 12 hours, minus 1¾ hours for meals equals 10¼ hours. Week, 61½ hours.

Hours in steel works at Essen (Krupp).

Begin	6 a. m.
Breakfast	8 to 8.15 a. m.
Dinner	12 to 1.30 p. m.
Tea	4 to 4.15 p. m.
Close	6 p. m.

Total, 12 hours, minus 2 hours for meals equals 10 hours. Week, 60 hours.

The shortest week in the list is 57½ hours, and the longest 62, both in textile mills. It may be said generally, that the normal day is 10 hours and the normal week 60 hours. To make a general comparison, we may say that the hours in Germany average about one a day more than in England and about one a day less than in the United States. The great difference between England and both these countries is the full Saturday half holiday enjoyed by English workmen, and the additional difference between the United States and both European countries is the number and length of the meal intervals allowed in the latter. As a rule, in the United States the only interval allowed is for dinner, and that is generally no more than three-quarters of an hour or half an hour. In some shops no interval is allowed at all; the men snatch their food as best they can. The machinery runs continuously, and this is the secret of the great production of the American steel mills in particular and of the excessively high wages earned in them. Men paid by the output and working an average of 72 hours a week naturally earn high wages. The meal intervals are even more liberal in Germany than in England; an hour and a half is allowed for dinner instead of an hour, and there is afternoon tea—or rather afternoon coffee—as well. This deliberateness and respect for meals is as char-

acteristic of Germany as indifference to them and hurry are of the United States. But the great advantage that British work people have is the Saturday afternoon.

It will probably not be long before the growing strength of continental and American trade unions extorts the same privilege without any diminution of earnings, and then the British manufacturer will be relieved of a serious handicap. The half holiday may, however, be secured by lengthening the other week days, as in the woolen mill at Elberfeld (see above). There, it will be noted, the ordinary day is from 6 a. m. to 6.30 p. m., and Saturday is clear after 2 p. m. But there is, undoubtedly, a strong movement in favor of shorter hours on the Continent, and it can not fail to take effect by degrees. Of the United States one can not speak with equal confidence. The desire to earn money at all costs is so intense and so completely outweighs all other considerations that the people themselves voluntarily shorten the dinner interval, as I have often seen, and many would, I verily believe, never leave their work at all if they could help it.

When work is carried on continuously, day and night, the shifts are of 12 or 10 hours. I have not heard of any 8-hour shifts. Adult male labor is limited by law in bakeries (12 hours), lead works (12 hours), and flour mills (8 or 10 hours' consecutive rest).

WAGES.

It is most difficult to make any general statement about wages with exactness. The conditions vary so greatly, not only in different places and different trades and at different periods, but even in the same factory, that a particular workman may earn half as much again one week as in the following week. Then the difference between rates of wages and earnings must be borne in mind. The former is the important thing from the manufacturer's point of view, the latter from that of the workman. Further, there is always great difficulty in ascertaining any data at all which are both exact and to be relied on. The statements made, quite in good faith, by employers and employed rarely agree; the former have the maximum most prominently in mind, the latter the minimum. This difference, by the way, is probably the most prolific of all causes of labor disputes. In textile mills, where the work is nearly all piecework, there is generally a regular and exact scale of prices, settled by mutual consent, but the method of reckoning is exceedingly technical, and varies in such a way as to make international comparisons difficult or impossible. Nor can the total wages paid in two similar factories and divided by the number of persons employed be taken as a valid basis of comparison, for there may be in one of them a number of old hands retained out of charity and earning very little. In short, the conditions vary to an infinite extent, and one must be content with rough comparisons.

Perhaps the best measure of the relative value of labor is the wage paid to the common unskilled day laborer. In English manufacturing towns last winter this was found to range from 18s. to 22s. [\$4.32 to \$5.28] a week, the former in the Midlands, the latter on the Tyne. In Rhineland it was 3s. [73 cents] a day or 18s. [\$4.38] a week; in Saxony 2s. 6d. [61 cents] a day or 15s. [\$3.65] a week. The labor market was about equally depressed in both countries, so that the comparison is valid, and I believe it fairly represents the relative values of

labor. In other words, wages are but little less in Rhineland than in England, but appreciably lower in Saxony. I understand that they are also lower in Silesia and Alsace-Lorraine, but I have had no opportunity for personal investigation there. When, therefore, "low wages in Germany" are spoken of a distinction must be made. They can hardly be called "low" in Rhineland. A manufacturer of alkali informs me that in the same trade in Lorraine, Hesse, and Anhalt the wage rate is 78 per cent of the English.

I am able to supplement this general comparison by some statements of earnings by skilled hands. In engineering workshops in Prussia I found fitters—called engineers in England—earning 36s. [\$8.76] a week; men doing the same work in England were getting 38s. [\$9.25] a week, the standing wage of the Amalgamated Society of Engineers; but the week is 60 hours in Prussia against 54 in England. Headmen in Prussian machine shops were getting up to £3 [\$14.60] a week, and on the forge up to £3 12s. [\$17.52]. On the other hand, in Saxony fitters were getting only about 21s. [\$5.10] a week. At Solingen I found skilled hands in cutlery works earning about the same as in Sheffield, but, if anything, rather more. Turning to textiles, I have some figures for weaving. In a Prussian cotton mill the average daily earnings of weavers for a series of years were as follows: 1896, 3s. 6½d. [86 cents]; 1897, 3s. 5d. [83 cents]; 1898, 3s. 5d. [83 cents]; 1899, 3s. 7d. [87 cents]; 1900, 3s. 7½d. [88 cents]; 1901, 3s. 6d. [85 cents]; 1902, 3s. 7d. [87 cents]. These averages, it is to be observed, include a number of old hands, some over 70. The average of the 20 best weavers in 1902 was 25s. 2½d. [\$6.14] a week; the highest came to nearly 28s. [\$6.82], the week being 57 hours. I took these figures from the books of the firm. In a worsted mill, said to pay the highest wages in the neighborhood, the average earnings of all the weavers was 25s. [\$6.09] a week, but the week was 62 hours. In a silk mill weavers earned up to 30s. [\$7.30] or more. These are higher than the earnings of weavers engaged in the same work in England, and they bear out the general conclusion suggested above that, on the whole, wages are but little less in Prussia than in England.

The figures given above for a series of years are interesting, because they show that wages have not been falling in recent years. The same fact is convincingly proved by the following table prepared at Krupp's works at Essen:

Average daily wage per head paid at the steel works, Essen.

Year.	Marks.	Dollars.	Year.	Marks.	Dollars.
1880	3.19	0.759	1891	4.45	1.066
1881	3.50	.833	1892	4.46	1.066
1882	3.57	.849	1893	4.59	1.073
1883	3.55	.844	1894	4.66	1.080
1884	3.65	.844	1895	4.70	1.075
1885	3.64	.866	1896	4.84	1.099
1886	3.71	.882	1897	4.88	1.077
1887	3.71	.882	1898	4.72	1.073
1888	3.71	.882	1899	4.72	1.073
1889	3.88	.911	1900	4.78	1.102
1890	3.95	.94			

The wages of coal miners show a corresponding rise. The Rhine Westphalian Coal and Iron Corporation in 1886 paid 70,000 men an average of \$230.86 per head, or about 3.23 marks [76.6 cents] a day; in

1900 they paid 135,000 men an average of 970 marks [\$322.25] per head, or about \$1.07 a day (Reichstag Debates, Feb. 12, 1903). In other words, the average weekly wage rose from 19s. 4½d. [\$4.66] in 1886 to 27s. [\$6.48] in 1900. But 1900 was a year of great, probably unexampled, prosperity in Prussia. There has since been a severe depression, with very slack employment. I do not know how wages stood in these two large industries in 1902, but so far as I have been able to ascertain the depression took effect rather in lack of employment than in a fall in the rate of wages, though in some industries the rate has fallen, too. Wages are usually paid weekly or fortnightly and on any day except Sunday.

I have not met with any instances of direct profit sharing in the form of participation by the workmen in the business, and have only heard of one firm which has recently started it in Münster. A bonus on the output is sometimes paid to foremen in iron and steel works, but is not, I believe, extended to the rank and file. This system is less common in Germany than in England or America.

The result of my inquiry as to wages differs considerably from that stated in the recently published Bluebook on British and Foreign Trade and Industry, upon which I have the following observations to make: (1) The sole source of information used in the bluebook is an inquiry made thirteen years ago for the United States Labor Department; (2) the basis of that inquiry is too small to permit of generalized statements in exact figures; (3) my inquiry relates to the large manufacturing industries, not to other trades; (4) the figures are borne out by budgets drawn up for me by workmen, to be subsequently published; (5) the bluebook makes no discriminations between different parts of Germany. The information it contains is seriously misleading as a comparison of existing conditions in competing industries.

OTHER CONDITIONS.

I have already said that many employers do a good deal for their people. In addition to housing and the provision of dining rooms, baths, and other conveniences within the factory, which have been previously mentioned, a great number of institutions are maintained, partly philanthropic and partly resting on the principle of self-help. A detailed account of them would occupy a volume, and then it would not be exhaustive, for such institutions depend on the good will of individual employers, and no comprehensive information exists about them. Perhaps the best and most interesting way of dealing with this aspect of factory conditions, which ought not to be omitted, will be to take a specific instance in detail, premising that some of the provisions—such as the sick fund, which is statutory, and the voluntary savings bank—are common to many establishments, while others are less usual.

The firm of D. Peters & Co., of Elberfeld, manufacturers of alpaca, worsted, and silk goods, on becoming a limited liability company in 1896, determined to place its various benevolent institutions on a permanent footing by forming a special company for their administration, entitled Welfare Fund of D. Peters & Co. in Elberfeld and Neviges (Limited), with a capital of £1,000 [\$4,866.50]. The concern is carried on by the cooperation of the firm, the general assembly of workers

and officials, and the council of elders. The general assembly meets annually in April, but extraordinary meetings may be called by the Welfare Fund or at the request of 60 male adult workmen. The business of the general assembly is to receive the annual report, elect the council of elders, and vote on resolutions, which may be proposed by the firm, the council of elders, or 15 delegates. The council of elders is an interesting institution, not uncommon in Germany, but unknown, I believe, in England. It consists of one member of the firm, who acts as chairman, but has no vote, and 8 ordinary members, half of whom are elected by the general assembly and half named by the firm. Only men over 30 years of age, who have been ten years in the employment of the firm, are eligible. The functions of the council are to examine the accounts, look after cases of need and misfortune, supervise the conduct of the younger work people, encourage them to self-improvement in their leisure time, combat rough behavior and drunkenness, assist in securing the observance of the factory rules and in preventing waste. Further, as representatives of employer and employed, they have in consultation with the firm to settle the factory rules, the piecework price list, the hours of work, and the means for preventing danger and increasing efficiency.

The object of the Welfare Fund is to administer the various institutions founded by the firm for the benefit of the work people. These are eleven in number.

1. Sick fund: Originally founded by the firm in 1861, but since 1885 regulated by the general law of sick insurance. The object is to provide immediate relief in cases of sickness and death. The employers contribute one-third, the work people two-thirds; the rate of contribution is $3\frac{1}{2}$ per cent of wages earned. The benefits are: Sick pay for twenty-six weeks to the extent of half the average wage; medical attendance, drugs, spectacles, bandages, etc., and hospital free to members; medical attendance and hospital free, and drugs, etc., half price to their families; 30s. [\$7.20] for confinements, £4 10s. [\$21.86] on the death of a member, £2 5s. [\$10.93] on the death of a member's wife. These benefits go beyond the requirements of the law. Such sick funds are universal, but are not necessarily administered in the same way.

2. Compulsory savings bank: All the work people must belong. Married men contribute 5 per cent and unmarried 10 per cent of their wages, but the council of elders may reduce the latter contribution to 5 per cent. Payments are made every pay day, except in the week before Easter and Whitsuntide and the week before and after Christmas. Money can only be withdrawn with the consent of the council of elders, unless it is required for the purchase of a house or furnishing on marriage. Interest at 6 per cent is paid on deposits up to £100 [\$486.65]; after that the depositor is free to dispose of his savings as he pleases. Persons leaving the employment receive their savings in full.

3. Voluntary savings bank: This is for persons who wish to continue saving beyond £100 [\$486.65] or to put by money for a short time. Interest at 5 per cent is paid on deposits by work people, officials, pensioners, and widows up to £300 [\$1,459.95], and by girls who have left work up to £200 [\$973.30]. On further deposits interest is paid at 4 per cent. For current deposits at short notice 3 per cent is paid. In the year 1900 the number of depositors was 771, and their savings

amounted to £24,595 [\$119,254]. Of this sum £15,152 [\$73,738] was held by 490 depositors in the compulsory bank, and £9,113 [\$45,955] by 281 depositors in the voluntary bank.

4. Assistance fund: For cases of sickness and need which do not fall within the legal competence of the sick fund. It is administered by the council of elders, and is formed out of the factory fines, interest on the original capital of the welfare fund, the takings of the bathing establishment, and voluntary contributions by the firm.

5. Pension fund: Founded in 1868 to make provision for persons in the employ of the firm who had become unable to earn their living, and maintained entirely by the firm. When the general infirmity insurance act was passed in 1889 the firm determined to continue their own fund in addition. The act requires employers and employed to contribute to the State insurance in equal parts; but the private pension fund had previously cost the firm twice as much as their statutory contribution under the act. They resolved, therefore, to continue contributing to the private fund the same amount as to the State insurance, until the former reached £5,000 [\$24,332], and from the interest thereof to supplement the State allowance to pensioners. In the spring of 1902 there were 23 pensioners, drawing £441 [\$2,146] from the fund in addition to £204 [\$992] from the State insurance. Fifteen out of the 23 had been in the service of the firm for an average of thirty-one years.

6. House-purchase fund: This is a special and noteworthy scheme. Its object is to help workmen to buy their own houses by installments. The attempt was first made by giving the men a present of a month's pay; but this failed. In 1878 the plan was tried of building houses and assisting workmen to purchase by bonuses, so that in the course of seventeen years a man might become the freehold owner of his house without paying any more than he would have done for renting an inferior house. A single payment of 8 per cent of the cost price was required, followed by annual installments of 8 per cent, and a bonus was added to each payment, ranging from 15 to 25 per cent, according to the workman's length of service. Down to the end of 1900, 36 family houses had been bought by workmen and 15 partly bought—in all 51—representing a cost of £8,400 [\$40,879]. They are capital houses, with gardens, and close to the mill. A somewhat different system has been adopted for a number of more expensive houses built since 1900.

7. Widows and orphans fund: Maintained by the firm and intended to fill a gap in cases where the death of the breadwinner deprives the family of the benefits of the assistance and pension funds.

8. The "Welfare" Institute: This is a large building standing in its own ground, devoted to the use and enjoyment of the work people. It was opened in 1883 to celebrate the fiftieth anniversary of the firm's foundation. It contains a large hall for festive gatherings, weddings, concerts, and so on; a smaller hall used for the weekly practices of the choral society; a large room used as a kindergarten for the work people's children and on two evenings a week for a well-attended hand-work school; a similar room used as a carpenters' shop for boys of school age; and a large kitchen used as a cooking school. Two courses of twenty-four weeks and two evenings a week are held in the year, and each class consists of eight girls.

9. Bathing establishment: Is next door to the mill. Shower baths

are free; other baths cost 2½d. [5 cents]. The proceeds go to the assistance fund. The baths are open to outsiders on payment.

10. Steam laundry: A complete and modern installation which does all the washing for the work people at an inclusive charge of 5s. [\$1.20] a quarter for each household, large or small. This results in a dead loss, so washing is taken in from the public at ordinary rates to make good the deficit.

11. Library: Founded in 1894, with 1,000 volumes of general and educational literature.

It only remains to say that this mill is situated in a manufacturing village a few miles out of Elberfeld; that the number of persons employed is about 500, and that the firm pays high wages. The aggregate sum standing in the various benefit funds at the end of 1900 was £41,100 [\$200,062], and the total payments made out of them up to that date amounted to £110,048 [\$538,468].

I do not wish the reader to understand that this is an ordinary case and that German factories in general are provided with all the accessories described. The case is somewhat exceptional, but the spirit which it illustrates is typical. It is selected for that reason as an unusually complete realization of ideas which are general and play an important part in German industrial life. It gives a good insight into the many-sided efforts for the promotion of thrift and the far-seeing, thorough, and judicious provisions for the welfare of those who depend on daily labor for their living. The establishment is not a show place; there is nothing fanciful about it; the provisions are sensible, practical, and directed to useful ends. It does not stand alone as a unique specimen; some of the provisions are general, others very common, and all may be found elsewhere, with other things in addition. At Haniel & Lueg's engineering works at Düsseldorf, for instance, a garden is provided where the workmen can pass the dinner hour in summer with their families, who have the entry. Then there are stores, as at Krupp's, where the workmen's daughters, to the number of several hundred, find employment and their families can buy everything. In connection with other factories again, the workmen have allotments and keep cows and pigs.

It must be admitted, however, that whether for good or evil the day of benevolent institutions on the part of employers is passing away, as I have observed before. The same movement is general. I find it alike in Germany, England, and America, where some very fancy experiments in the way of Arcadian settlements have not prevented prolonged and bitter strikes. On the other hand, the day of the pound-of-flesh employer is also passing away. The United States Steel Corporation has found it politic to introduce profit sharing as a set-off to the conditions of life prevailing at some of its numerous establishments * * *. Profit sharing is one alternative; another is to provide really good factory conditions, good wages, and every internal arrangement which conduces to efficient labor, while avoiding outside interference partaking of paternal relations. This principle marks some of the most modern and efficient concerns in all three countries. Both methods are sound; their combination would be impregnable.

8. HOME CONDITIONS.

HOUSING.

A good deal of information about housing has already been given in connection with particular towns, but the subject requires more comprehensive treatment. It is the most important of all home conditions, and particularly so in Germany. Readers who have followed the earlier articles of this series will have gathered that industrial housing is highly unsatisfactory in Germany, and that various efforts have been made to meet the difficulty. I will now give some further information on both these points.

To judge from villages, small old-fashioned towns, and the older parts of modern cities, a considerable part at least of the industrial population used formerly to be housed in cottages, as in England. The general and ever-increasing extension of tenement or barrack housing has arisen from the demand for urban accommodation which has accompanied the industrial expansion of the last thirty years. The beginnings of that need which has developed into a regular house "famine," as it is commonly termed in Germany, go back somewhat earlier. Alfred Krupp found himself obliged to provide housing for his workmen in 1863; a building company was started in Bonn in 1864, one in München-Gladbach, of which some account has been given, in 1868, and one in Barmen in 1872. But these earlier efforts in the Rhine province were isolated; the pressure was not generally felt until later, and it increased gradually as the towns drew the people in from the country. It is during the last ten or twelve years that the trouble has become really acute.

The remarkable period of prosperity which culminated in 1900 caused a great demand for labor, and a stream of foreign immigrants, including Poles and Italians, flowed into the industrial centers. Their presence is attested by the fact that it has been found necessary in some of the Rhine towns to put up public notices in those languages. At the same time the native rural population was steadily moving townward, and emigration overseas dropped down to insignificant proportions. It is not generally realized that in recent years Germans have almost ceased to emigrate. The number leaving the country dropped from 203,585, or 4.55 per cent of the population, in 1882, to 22,073, or 0.39 per cent of the population, in 1901. It has since risen slightly again. The shifting of the industrial balance is indicated by the following figures from the last two occupational censuses:

Agricultural and industrial population of Germany, 1882 and 1895.

Year.	Agricultural population.	Industrial population.
1882	18,840,818	16,058,080
1895	18,501,307	20,253,241

The "rural exodus" between 1895 and 1900 is further shown by the fact that the population of East Prussia actually diminished in that period, and the increase in Pomerania and Posen was only 3.9 and 3.2 per cent, whereas in the industrial regions of Westphalia, Rhineland, and Saxony it was 18, 12.8, and 10.9, respectively.

The result of this movement is the house "famine" in the manufacturing towns. It varies in intensity, no doubt, and the pressure has probably been somewhat relaxed of late by the falling labor market and the erection of new dwellings; but complaints are still general, rents are very high, and accommodation is inadequate. Some exact information was obtained on the subject in Düsseldorf by a special inquiry conducted on behalf of the Provident Building Society (Spar- und-Bau Verein) in 1900. It appears to have been instigated by the fact that in the previous winters the town authorities were compelled to find shelter for a number of homeless families, the heads of which were not out of work, or very poor, or unable to pay rent, but simply houseless, largely because they had children; for in Germany, as elsewhere, one result of the excessive demand for housing is that people refuse to let their rooms to tenants with large families.

The inquiry was conducted by the local trades council or association of trade unions, which sent out a question form to be filled in by the workmen with particulars as to occupation, earnings, number and age of children, rent paid, number of rooms, etc. The interesting feature of the inquiry is that it relates not to the lowest class of the population, but to married workmen of all kinds in good employment. Particulars were obtained of 194 families. Their average earnings were 4s. [96 cents] a day; 111 lived in two rooms, 68 in three rooms, 11 in four, 3 in five, and 1 in six rooms. Those of the last three classes either lived in old farmhouses on the edge of the town or took in lodgers. The inference is drawn that 60 per cent of the better-paid class of workmen in Düsseldorf live with their families in two-room tenements. The average rent paid for this accommodation was 3s. 8d. [88 cents] a week; but it is remarked that all the dwellings at this rent or below it, except those erected by a charitable trust or by factory owners, are on the extreme outskirts of the town, and that the cheapest, which bring down the average, are attics or "little boxes in old farmhouses." The better dwellings were rented at 4s. [96 cents] a week and upward for two rooms, and the highest were 5s. 4d. [\$1.28] a week. One man, a smith, earning 1,050 marks [\$249.90] in the year, had to pay 280 [\$66.64] for rent, leaving 14s. 9d. [\$3.54] a week to live on; he had 2 children, aged 9 and 11. That makes 52 pfennigs [12 cents] a day per head; the prison scale is 80 pfennigs [19 cents]. The children in these two-roomed dwellings were of all ages, from infancy to 21, and the number in each family ranged from 1 to 6; but for the most part, workmen in good employment, with more than 3 children, make shift to get three rooms, and of course pay a higher rent. One case on the list was that of a day laborer with 9 children, who had 10s. 6d. [\$2.56] a week to live on after paying his rent.

The houses are all of the tenement class. The average number of families to a house was 8.14 and the average number of persons 40. Remarks appended by the workmen go to show that even the dwellings for which the rent is over 2s. [48 cents] a week per room are often very defective and unsanitary, and cases are given of the constant and rapid rise of rents. One man who paid 27s. 6d. [\$6.60] a month for three

rooms had his rent raised thrice in the course of the year, until it stood at 8s. 11d. [\$2.17] a week. Unfurnished tenement rooms at 3s. [72 cents] a week each!

Experience has taught me to regard "shocking revelations" with profound distrust, and of course a report of this kind, which has a distinct object in view, is not intended to make the best of things; but it is quite in keeping with other information and with the results of personal observation, and I believe that it substantially represents the truth. There is no doubt about two things—the high rents and the tenement dwellings. The first of these troubles is not all due to the greed of landlords, though they doubtless take advantage of the demand and charge the utmost for bad accommodation. Housing is dear in Düsseldorf even when landlords have the best intentions in the world. The municipality has had the same experience as the London county council in this respect. The rents charged for the last block of workmen's dwellings erected by the town average 10s. [\$2.43] a month per room, or very nearly 2s. 4d. [56 cents] a week. I have been over these dwellings. They are not built like the huge blocks of "model" tenements in East and South London, but after the later style of flats; that is to say, in a series of four-story houses, having sets of tenements on each floor.

A tenement consists of a kitchen with one, two, or three rooms. Most of them consist of a kitchen with two rooms, and are occupied by married artisans or municipal workmen. The rent for such a three-room dwelling is about 30s. [\$7.30] a month, or 7s. [\$1.68] a week. This is the same rent that I have found in similar dwellings erected on the outskirts of Berlin, but in Berlin the blocks are several stories higher and the rooms considerably smaller. In Düsseldorf they are of very fair size, and the fittings are good. In fact, the difference between dwellings built by a speculator and those by a public or benevolent body is not that the latter are cheap, but that they are good, whereas the former are frequently or generally both bad and dear. In a three-room dwelling a man and wife and a moderate number of children can live quite decently so long as the children are little. The kitchen is used for meals and the two rooms for bedrooms—the older children in one and the parents with the very young children in another. The furniture in those I have seen was good, with many little ornamental additions, and everything spotlessly clean. The German women of this class are notable housewives; you always find them hard at work, cleaning, washing, cooking, or sewing, and I think that nothing in German life so conduces to the strength, stability, and well-being of the nation as this. But for the admirable home qualities of the women the housing question would be far more serious than it is.

I have been led from one point to another a little out of my course, and return to the subject of rents. To go outside Düsseldorf and to show that it is no exceptional case, though among the worst, I quote the following figures from Harnisch's Yearbook for the Province, translating the annual into weekly rent, as it is always reckoned by the week in England:

Average weekly rent for an unfurnished room in towns of Rhine province.

Town.	Shillings and pence.	Cents.	Town.	Shillings and pence.	Cents.
Ruhrort	2 6½	61	Remscheid	1 11	46
Barmen	2 4	56	Mülheim	1 10	44
Crefeld	2 1½	51	Oberhausen	1 9	42
Duisburg	2 1½	51	München-Gladbach	1 9	42
Solingen	2 1	50	Essen	1 8	40

These are all manufacturing, and most of them iron, towns in the Rhine Province. They are not selected because the rents are high, but as the largest towns for which this information is given in the Yearbook. In Chemnitz I was informed that the average rent for two rooms was about 12s. or 13s. [\$2.91 or \$3.16] a month, which comes to about 1s. 6d. [36 cents] a week per room, and I find that the actual average paid by six workmen, who drew up family budgets for me, was 1s. 5½d. [35 cents] a week. Outside Chemnitz, in the surrounding villages, where many of the work people lodge for lack of accommodation in the town, the rents are about half this. It appears, therefore, that this item of expenditure is decidedly lower in Saxony than in the Rhineland, and thus the disparity in wages is to some extent redressed; but the house famine is nevertheless hardly, if at all, less acute there.

This state of things obviously provides the Social Democrats with a powerful lever for pushing their views, because the private ownership of land is one of the causes of costly building; and the great increase of their polls in the Ruhr district in particular coincides with the growing house famine in the iron and coal towns of that region. But private ownership is not the only cause, if indeed it is a cause at all; otherwise housing would be equally dear in English manufacturing towns, whereas it is hardly more than half, on the average. Perhaps the system of tenure has more to do with it. In Germany conveyancing is the simplest matter; the two contracting parties go before the local official, pay a small fee, and the thing is done. Consequently people will not take land on a lease for building; they buy outright, which entails a heavy initial outlay, though it is doubtless good economy in the end. Then the cost of materials appears to be very high; it has risen of late years, as that of labor has risen; these two account for a large part of the increased cost of building, and to them must be added the requirements of modern administrations under the law. You can not have by-laws and inspectors without paying for them.

Whatever the cause, the fact remains that the housing is not only dear, but inadequate; for tenements—without any garden or even curtilage—are a poor substitute for houses. London is far worse off than the manufacturing towns of England in respect of housing; but even in and about London the great bulk of the working classes still live in separate houses, with some ground about them where they can at least dry their clothes. In "London over the border" there are hundreds of miles of streets consisting entirely of workmen's cottages with four or five rooms. The rent for new ones, with hot and cold water and other conveniences, is 8s. 6d. or 9s. 6d. [\$2.04 or \$2.28] a week. The following table of the average number of persons to each inhabited

house in the 20 great towns of Prussia, taken from the census of 1900, gives a rough general idea of the prevalence of the flat system:

Number of inhabitants per house in 20 great towns of Prussia.

Berlin	46.6	Altona	19
Breslau	39.1	Elberfeld	18.7
Köln	15.5	Halle	20.7
Frankfort	17.5	Dortmund	19.6
Hanover	20.1	Barmen	18
Magdeburg	31.6	Danzig	19.5
Düsseldorf	19.4	Aachen	17.3
Stettin	34.2	Essen	18.6
Königsberg	30.6	Posen	37.6
Charlottenburg	48.3	Kiel	22.4

In 13 of these towns the number of inhabitants per house has steadily increased since 1890. For Saxony we have the following:

Number of inhabitants per house in towns of Saxony.

Leipzig	27.09	Plauen	18.03
Dresden	27.50	Zwickau	18.73
Chemnitz	29.16	Zittau	13.72

But in order to see how the industrial population lives we must look a little closer and take a particular example. Elberfeld and Barmen will do very well; they are typical industrial towns of medium size, and the number of persons to a house is comparatively low. In Elberfeld the number of inhabitants to the acre is 20 for the whole town; but if we take the two most densely populated districts, we find that the number rises to 185 and 190, respectively. The two most densely populated districts in London, with the largest number of tenement blocks, are Shoreditch and Southwark, with 180 and 182 persons to the acre, respectively (1901), though if registration subdistricts be taken one can reach much higher figures. In these two quarters of Elberfeld considerably more than half the houses contained over 6 families each, and some of them over 16 families. In Barmen the police made an examination of 100 houses inhabited by the laboring class in the year 1897. They contained 2,106 rooms and attics and were inhabited by 882 families, numbering 4,787 persons. The average was 21 rooms, inhabited by 9 families of 48 persons, to each house, and the average number of persons to a room was 2.25. In England more than two persons to a room is reckoned as "overcrowding," and the proportion of the population of London so living in tenements in 1901 was 16.01 per cent. In Barmen the proportion of the tenants of the model dwellings built by the Barmen Building Company so living (namely, more than two in a room) in 1897 was exactly the same.

I might give further details of a similar character, but probably enough has been said to present a fairly definite view of the position, and my remaining space must be devoted to the other side of the picture.

HOUSING REFORM.

The pressure of the housing difficulty has been felt, and the necessity of dealing with it widely realized, for a good many years. The problem has been attacked in many ways and by various agencies—by the State and the local community, by building societies, building com-

panies, philanthropists, and manufacturers—and in the aggregate much has been done. The Germans are not the people to sit down before a difficulty and wring their hands or call for help; they tackle it individually and collectively. The subject is very large and I must confine myself to Prussia, and particularly to the Rhineland and Westphalia, where the need and the activity have both been greatest.

(1) The State has provided housing for its own servants and principally for the subordinate classes of railway men. In October, 1901, there were built or building in the two provinces 473 houses, containing 2,231 dwellings and 7,009 rooms, at a cost of £451,160 [\$2,195,569], including sites. The interest on the total outlay comes out at 3.65 per cent. These houses are principally situated in the railway districts of Essen and Elberfeld, where the need is greatest. Further, in the Saarbrück coal mines, which belong to the Prussian Government, a system of helping the men employed, who numbered over 40,000 in 1900, to build their own houses by means of gifts and loans has been developed on a large scale. The gifts are to the value of from £37 to £45 [\$180 to \$218]. The loans are free of interest up to \$364, and at 3½ and 4 per cent beyond that. The conditions are that the recipient shall be married and the owner of a building plot free of debt. The houses so built are, as a rule, single cottages for one family. The loans are repayable in ten years. Down to 1901 the amount provided in gifts and loans amounted to £767,725 [\$3,736,133]. In addition the administration itself erected houses for 441 families.

(2) Local communities: Some municipalities provide houses for their own servants and for needy families; but a number of local authorities have gone beyond this and have built houses for the lower classes at large. This has been done in 15 Rhine districts and 5 Westphalian. The earliest was the Merzig district, which was stimulated to the step by a housing investigation in 1894. Among the most active is Düsseldorf, which had in 1901 built dwellings for 141 families; 80 of the tenants were in the service of the municipality. The 141 dwellings were thus classified—43 of two rooms, 85 of three rooms, 13 of four rooms. Local authorities have further promoted building by lending money from the public savings banks at low interest, and by cooperating with building societies in various ways. They provide cheap building sites, take over shares, guarantee interest on loans, facilitate the laying out of streets, and reduce the ground and building rates.

(3) Charitable endowments: These are rather scanty. The most considerable is the Aders fund at Düsseldorf. The testator, a judge, left about £100,000 [\$486,656], of which half was to be applied to educational purposes and half to the provision of dwellings at moderate rentals for factory workers, or others of the same class who were not in receipt of poor law relief. The town took over the fund in 1890, and in 1902 had provided out of it dwellings for 257 families, while the fund itself had risen to the value of £82,100 [\$399,539]. As it increases, in the course of time it will play a correspondingly important part in the matter of housing. Other endowments in the district are the Krupp fund of £25,000 [\$121,662] at Essen, the Guillaume fund at Cologne, the Hösch fund at Düren, and the Simonson fund at Godesberg. The aggregate number of dwellings provided from these endowments in 1902 was 364 at a cost of £107,300 [\$522,174]. They are only for rent, not for sale.

(4) Building societies: These are numerous and active. They claim

the character of public utility and the merit of providing unexceptionable housing at the lowest cost for persons of small means, and thereby raising the standard of life. Details from 109 societies in the Rhine Province were furnished to the Düsseldorf Exhibition in 1902. The 109 consisted of 20 share companies, 4 limited liability companies, 83 registered societies, and 2 others. To these may be added 37 unions in Westphalia, which also furnished details. Putting them together we get the following: Houses, 3,877; dwellings, 9,714; rooms, 32,467; one-family houses, 748; two-family houses, 2,155; three-family houses, 377; four or more family houses, 567.

Three-fourths of the houses therefore contain only one or two families. They are, in point of fact, semidetached, and with gardens in the majority of cases, and are obviously a great improvement on the tenements of the speculative builder. The total expenditure on sites and buildings was £1,657,602 [\$8,066,720]. Of the houses, 2,631 were sold and 1,216 were let; the amount paid off on those sold was £231,863 [\$1,128,340].

Of the families occupying them, 9,331, or all but 383, belonged to the laboring class. The membership of the registered societies included was 18,428, of whom 14,226 belonged to the laboring classes. This is a substantial record for the very short time—not more than two or three years—during which the greater number of the societies have been in active existence. Not the least service they have rendered is the steady adherence, except in the more central parts of the larger towns, to the principle of small houses and ample ground space. In the year 1901 more than one-fifth of the new housing required by the increase of population in the Rhine Province was provided by the foregoing agencies, and was therefore of a superior character. Unfortunately the rest of Germany has by no means exhibited an equal activity in this direction. It is reckoned that between one-fourth and one-fifth of the total cooperative building in the Empire has fallen to the share of this single province. The total number of building societies in Germany at the end of 1899 was 356, of which the Rhineland claimed 94. The exceptional efforts in this district have been largely due to the formation of a general building association in 1897, having its seat in Düsseldorf and enjoying the support of the provincial government. The committee consisted of representatives of local authorities and several previously existing building societies and companies and private manufacturers. Its origin is traced to the old age and infirmity insurance law of 1889, which opened the way to a new movement in cooperative action. The association has stimulated the formation of new building societies with great success, and has promoted the housing movement in various ways. One of them is particularly interesting from the industrial point of view. Prizes were offered for designs for model furnishing, not to exceed the following cost: Kitchen, £8 [\$38.93]; bedroom (with one double bed), £10 10s. [\$51]; living room, £12 [\$58.40]. They produced 122 sets of designs, many of great merit.

Similar associations have been formed in Frankfort, Münster, and Wiesbaden; but the earliest example is the "Arbeiterheim" association in Bielefeld, founded by Pastor Bodelschwingh.

(5) Employers: I have referred in several previous articles to houses built by manufacturers. Employers have indeed done more for housing than all the other agencies put together. In 1902 the two prov-

inces (the Rhine Province and Westphalia) could show the following remarkable record, pretty evenly divided between them: Houses, 22,269; dwellings, 62,539; total expenditure, £10,466,460 [\$50,937,460]; loans and gifts for building, £268,986 [\$1,308,582].

Of the total number of families so housed more than half belonged to the mining industry. Their distribution, according to the census classification, was as follows: Mining, 32,396; iron, 16,471; textiles, 6,659; quarrying, 3,987; various, 3,026. Naturally, the housing provided for the mining population is situated chiefly in Westphalia, where about 19,000 dwellings have been built; and the same industry accounts for \$535,315 of the loans granted for building. The other industries preponderate in the Rhine province.

It is hardly necessary to add that savings banks, whether public or private, play an all-important part in the building and acquisition of workmen's dwellings.

9. COST OF LIVING.

The best way of giving an insight into the cost and manner of living of industrial Germany will be to put down a number of household budgets drawn up for me by workmen. The first set comes from a manufacturing town in Prussia, the second from a similar town in Saxony. The families are in all cases those of artisans or factory hands. I give the lists as they stand; some represent the expenditure of an average week, others that of a month, and some are more complete than others. I thought it best to give no more than an outline of what was wanted and leave them to fill it in themselves, as a certain amount of light is thereby thrown upon their intelligence and an artificial symmetry is avoided. One very careful man returned the outline with the observation that this "statistic" was so defective as to give no real light, a number of things being left out. It did not occur to him to put them in. Others have done so more or less fully, which is just what I wanted. A budget is not a statistic but a document, or should be.

I may here explain that taxes mean income tax, which all Germans earning over 900 marks [\$214.20] a year have to pay, whatever their station in life. The item "sick fund" includes all forms of insurance and trades-union subscriptions.

Prussian family budgets.

No. 1. Number of persons, 3; number of rooms, 2. Average for four weeks.

Income.	Marks.	Dollars.	Expenditure.	Marks.	Dollars.
Earnings	110.00	26.18	Rent	19.00	4.522
Earnings of wife and children			Bread	12.00	2.856
Total	110.00	26.18	Meat and sausage	21.00	4.998
			Milk	6.00	1.428
			Butter	6.00	1.428
			Cheese	1.00	.238
			Coffee	3.60	.857
			Clothing	20.00	4.76
			Boots	5.00	1.19
			Firing	4.50	1.071
			Light	2.40	.571
			Taxes	3.00	.714
			Sick fund	1.50	.357
			Beer and amusements	2.00	.476
			Put by for emergencies	3.00	.714
			Total	110.00	26.180

Prussian family budgets—Continued.

No. 2. Number of persons, 7; number of rooms, 4. Average for one week.

Income.	Marks.	Dollars.	Expenditure.	Marks.	Dollars.
Earnings	38.00	9.04	Rent	8.00	1.904
Earnings of wife and children	8.00	1.904	Bread	6.08	1.448
Total	46.00	10.944	Meat and sausage	6.30	1.495
			Milk	1.44	.343
			Butter	3.30	.785
			Cheese	1.00	.238
			Coffee	1.20	.286
			Clothing	7.00	1.666
			Boots	5.00	1.19
			Taxes	8.50	2.023
			School .....	.50	.119
			Firing	1.00	.238
			Light .....	.48	.114
			Sick fund	1.66	.395
			Beer and amusements	2.00	.476

This does not balance; the expenditure is in excess of the income. Taxes are probably for the quarter. "School" means schoolbooks. The man is employed in a foundry.

No. 3. Number of persons, 6; number of rooms, 3. Average for one week.

Income.	Marks.	Dollars.	Expenditure.	Marks.	Dollars.
Earnings	27.00	6.426	Rent	5.50	1.310
Earnings of wife	1.00	.238	Bread and potatoes	2.50	.596
Total	28.00	6.664	Meat and sausage	4.15	.980
			Milk	1.75	.416
			Butter	2.80	.662
			Cheese .....	.50	.119
			Coffee	1.00	.238
			Clothing	2.00	.476
			Boots	2.00	.476
			Firing	1.70	.406
			Light .....	.50	.119
			Taxes .....	.55	.131
			Sick fund, etc	1.54	.367
			Building society .....	.40	.095
			Beer and amusements	1.00	.238
			Total	27.89	6.638

No. 4. Number of persons, 5; number of rooms, 3. Average for one week.

Income.	Marks.	Dollars.	Expenditure.	Marks.	Dollars.
Earnings	39.00	9.282	Rent	6.00	1.428
Earnings of wife and children			Bread	5.00	1.19
Total	39.00	9.282	Meat, etc	6.00	1.428
			Milk	1.00	.238
			Butter	2.40	.571
			Cheese .....	.60	.140
			Coffee .....	.60	.140
			Clothing	3.00	.714
			Boots	2.00	.476
			Firing	1.80	.430
			Light .....	.40	.095
			School books (month) .....	.75	.171
			Taxes (quarter)	5.00	1.19
			Sick fund, etc .....	.85	.202
			Society subscription papers, etc	1.00	.238

Prussian family budgets—Continued.

No. 5. Number of persons, 4; number of rooms, 2. Average for four weeks.

Income.	Marks.	Dollars.	Expenditure.	Marks.	Dollars.
Earnings	105.00	24.99	Rent	20.00	4.76
Earnings of wife and children			Bread	8.80	2.094
Total	105.00	24.99	Meat, etc.	22.40	5.331
			Milk	8.00	1.904
			Butter	8.00	1.904
			Cheese	1.60	.381
			Coffee	4.00	.952
			Clothing	8.00	1.904
			Boots	4.00	.952
			Firing	4.00	.952
			Light	1.60	.381
			Taxes	1.25	.297
			Sick fund	4.00	.952
			Beer and amusements	10.00	2.38

Saxon family budgets.

No. 1. Number of persons, 4; number of rooms, 2. Average for one week.

Income.	Marks.	Dollars.	Expenditure.	Marks.	Dollars.
Earnings	27.00	6.426	Rent	3.00	0.714
Earnings of wife and children	5.00	1.19	Bread	4.50	1.071
Total	32.00	7.616	Meat, etc.	3.50	.833
			Milk	1.00	.238
			Butter	3.00	.714
			Cheese .....	.30	.071
			Coffee .....	.60	.143
			Clothing	3.50	.833
			Boots	3.00	.714
			Firing	2.50	.595
			Light .....	.50	.119
			School .....	.10	.024
			Taxes .....	.70	.167
			Savings bank	2.00	.476
			Sick fund .....	.80	.190
			Beer and amusements	1.00	.238
			Pocket money	2.00	.476
			Total	32.00	7.616

No. 2. Number of persons, 8; number of rooms, 3. Average for one week.

Income.	Marks.	Dollars.	Expenditure.	Marks.	Dollars.
Earnings	18.00	4.284	Rent	5.00	1.19
Earnings of wife and children	14.00	3.332	Bread	3.50	.833
Young man lodger	2.00	.476	Meat	6.00	1.428
Total	34.00	8.092	Milk	1.40	.323
			Butter	2.80	.666
			Cheese, etc. ....	.80	.190
			Coffee .....	.35	.083
			Potatoes, flour, and sugar	1.52	.362
			Salt, vinegar, oil, spice, and spirits .....	.60	.143
			Soap, soda, wax, grease, and brushes .....	.81	.193
			Vegetables	1.00	.238
			Clothing	3.00	.713
			Boots	1.50	.346
			Firing	1.25	.297
			Light .....	.34	.081
			Taxes .....	.45	.107
			School and books .....	.35	.083
			Pocket money .....	.75	.178
			Sick fund, etc. ....	.83	.197
			Papers .....	.16	.038
			Doctor and drugs .....	.60	.143
			Total	32.91	7.832

This is by far the most complete budget; evidently a careful man.

Saxon family budgets—Continued.

No. 3. Number of persons, 5; number of rooms, 2. Average for one week.

Income.	Marks.	Dollars.	Expenditure.	Marks.	Dollars.
Earnings	27.00	6.426	Rent	3.50	0.833
Earnings of wife and children.	1.75	.419	Bread	3.60	.857
Total	28.75	6.845	Meat, etc.	3.10	.738
			Potatoes, flour, sugar ..	2.00	.476
			Milk	1.10	.262
			Butter	2.80	.683
			Cheese .....	.20	.048
			Coffee .....	.60	.143
			Clothing	3.50	.833
			Boots	1.80	.424
			Firing	1.50	.367
			Light .....	.30	.071
			Taxes .....	.70	.167
			School .....	.30	.071
			Sick fund, etc. ....	.75	.178
			Savings bank	1.00	.238
			Miscellaneous	2.00	.476
			Total	28.75	6.845

No. 4. Number of persons, 3; number of rooms, 2. Average for one week.

Income.	Marks.	Dollars.	Expenditure.	Marks.	Dollars.
Earnings	24.00	5.712	Rent	3.00	0.714
Earnings of wife and children.			Bread	2.10	.500
Total	24.00	5.712	Meat, etc.	3.00	.714
			Milk .....	.70	.167
			Butter	2.10	.500
			Cheese .....	.50	.119
			Flour, sugar, salt, etc.	1.50	.357
			Coffee .....	.75	.181
			Clothing	4.00	.962
			Taxes .....	.50	.119
			School .....	.10	.023
			Firing	1.50	.357
			Light .....	.50	.119
			Savings bank	1.00	.238
			Sick fund .....	.45	.107
			Beer, amusements, and pocket money	2.50	.599
			Total	24.00	5.712

No. 5. Number of persons, 6; number of rooms, 2. Average for one week.

Income.	Marks.	Dollars.	Expenditure.	Marks.	Dollars.
Earnings	17.00	4.046	Rent	2.00	0.488
Earnings of wife and children.	1.00	.238	Bread	1.30	.312
Total	18.00	4.284	Meat, etc.	3.00	.714
			Milk	1.00	.238
			Butter	2.40	.571
			Cheese .....	.50	.119
			Coffee .....	.50	.119
			Clothing	1.00	.238
			Boots	1.00	.238
			Firing	1.30	.312
			Light .....	.50	.119
			Taxes .....	.60	.143
			School .....	.40	.095
			Sick fund, etc. ....	.40	.095
			Beer and amusements .....	.70	.167
			Total	18.00	4.284

Saxon family budgets—Continued.

No. 6. Number of persons, 8; number of rooms, 2. Average for four weeks.

Income.	Marks.	Dollars.	Expenditure.	Marks.	Dollars.
Earnings	60.00	14.28	Rent	10.00	2.380
Earnings of wife and children	40.00	9.52	Bread	19.20	4.570
Total	100.00	23.80	Meat, etc.	18.40	4.379
			Milk	2.80	.662
			Butter	15.60	3.712
			Cheese, potatoes, flour, etc.	10.00	2.390
			Coffee	2.30	.547
			Clothing	3.00	.710
			Boots	5.00	1.190
			Firing	4.00	.952
			Light	3.00	.714
			Taxes	1.00	.238
			School .....	.80	.190
			Beer and amusements	4.90	1.166
			Total	100.00	23.800

An inaccurate budget; butter and boots are evidently far too high, milk and clothing too low.

Here we have eleven families, none of them poor, but belonging to the class of workmen in good employment. The average weekly income in the Prussian group is 33s. 4d. [\$8.11] and in the Saxon 27s. 4d. [\$5.04]. The lowest is 18s. [\$4.38] and the highest 46s. [\$11.19]. The aggregate number of persons is 59 and they live in 27 rooms, for which they pay a rent of 48s. 3d. [\$11.74] a week. The average number of persons to a room is $2\frac{1}{2}$, and the average weekly rent paid for it 1s. 9½d. [43 cents]. But if we distinguish the two sets we find that the overcrowding is much greater in the Saxon town, while the rents are much higher in the Prussian one. Thus—

Housing statistics taken from budgets given above.

Town.	Persons.	Rooms.	Total rent.		Persons per room.	Rent per room.	
			English currency.	U. S. equivalent.		English currency.	U. S. equivalent.
Prussian.....	25	14	s. d. 29 3	\$7.12	1½	s. d. 2 1	\$0.51
Saxon	34	13	19 0	4.62	2½	1 5½	.35

These figures speak for themselves. In similar English towns, I may observe, families of this grade always live in separate houses, which generally contain not less than four rooms, and the average rent per room is not more than 1s. 2d. [28 cents].

It will be noticed that all the families pay income tax, and that the Saxon budgets also include school pence. In Saxony elementary education is not free.

With regard to food, expenditure tells little unless the purchasing power of money is known. Taking 1 pound as equivalent to one-half kilogram (it is a trifle less), I find the following prices current last December in the Prussian town from which the first set of budgets is taken:

Prices per pound of food in Prussian town.

Articles.	English currency.	U. S. equivalent.	Articles.	English currency.	U. S. equivalent.
Wheat flour	1½d. to 2 d.	3 to 4 cents.	Bacon.....	10d. to 1s.	20 to 24 cents.
Rye	1½d.	3 cents.	Butter	1s. 2d. to 1s. 3d.	26 to 28 cents.
Beef	8 d. to 9½d.	16 to 19 cents.	Sugar	3½d. to 4d.	7 to 8 cents.
Mutton	8½d. to 9 d.	17 to 18 cents.	Coffee	1s. to 1s. 7d.	24 to 31 cents.
Veal	9½d. to 10½d.	19 to 21 cents.	Eggs (dozen) ...	5½d. to 10d.	11 to 20 cents.
Pork.....	10d. to 1s.	20 to 24 cents.			

The only thing on this list cheaper than in England is eggs. Wheat flour and butter are about the same, sugar is about double, and beef and mutton are considerably dearer than the cheapest quality in England, which is little, if at all, inferior. Beef and mutton of the same quality as the best English are not to be had in Germany.

For the Saxon town I have the following prices:

Prices per pound of food in Saxon town.

Articles.	Pence.	Cents.	Articles.	Pence.	Cents.
Black bread	1	2	Pork	9 to 10½	18 to 21
Beef	8	16	Milk (pint)	1½	2½
Mutton	7	14	Skimmed milk (pint).....	1	1
Veal.....	7	14			

The prices are lower than in Prussia. They were obtained last winter on the spot; but it is to be noted that the cost of food shows very little uniformity; according to recorded statistics, it varies greatly in different places and at different times. For instance, in 1898 the price of wheat flour was 47 pfennigs the kilogram [11.2 cents for 2.2 pounds] in Chemnitz and 42 pfennigs [10 cents] in Dresden; whereas in 1901 it was 32 pfennigs [7.6 cents] in Chemnitz and 35 pfennigs [8.2 cents] in Dresden; the price of rye flour was the same in both years. Again, while rye flour is appreciably cheaper in Dortmund than in Chemnitz, rye bread is dearer. The prices of meat show similar discrepancies. In view of such variations, too much reliance must not be placed on isolated cases as generally representative of the country. To obtain a trustworthy estimate one must collate the retail prices in a number of German towns and extract the mean. The following are taken from the *Statistisches Jahrbuch Deutscher Städte*, for which they were prepared by a very accomplished statistician, Dr. K. Singer, of Munich. The latest year with which the *Jahrbuch* deals is 1901. I give the original measures and currency, because the smaller variations can not be expressed in English terms. The prices are stated in pfennigs, and the measure is the kilogram. The English [and American] equivalent of the mean prices is given at the foot of the column:

Average retail prices per kilogram (2.2 pounds) of food in German towns in 1901.

Town.	Beef.	Pork.	Veal.	Mutton.	Butter.	Wheat flour.	Rye flour.	Rye bread.
	<i>Pfennigs.</i>	<i>Pfennigs.</i>	<i>Pfennigs.</i>	<i>Pfennigs.</i>	<i>Pfennigs.</i>	<i>Pfennigs.</i>	<i>Pfennigs.</i>	<i>Pfennigs.</i>
Berlin	144	143	140	133	238	26	22	24
Altona	163	156	164	145	241	29	28	25
Hanover	135	130	135	125	224	29	28	22
Breslau	144	138	140	148	240	27	24	22
Görlitz	130	135	119	129	230	39	31	22
Magdeburg	145	130	130	130	231	29	26	22
Cologne	146	179	152	134	236	32	29	22
Dortmund	130	128	135	130	230	25	24	24
Frankfort	150	170	125	115	228	36	31	27
Munich	128	139	118	104	202	38	34	30
Dresden	158	147	145	145	255	35	30	22
Chemnitz	150	145	136	115	260	32	30	22
Stuttgart	147	147	117	117	230	36	34	22
Mannheim	153	160	150	150	240	39	32	24
Mainz	142	147	93	93	210	33	26	26
Darmstadt	144	152	140	140	228	39	26	24
Strassburg	148	149	166	154	209	36	34	26
Lübeck	127	132	144	129	226	27	26	17
Mean	141	145	142	129	231	32	28	24
Mean per pound (in pence)	8	8½	8½	7½	13	2	1½	1½
Mean per pound (in cents)	16	17	16½	15	26	4	3	2½

The mean figures here agree very fairly with those given above for the two selected towns last winter. We may therefore conclude that they represent the mean food value of money in Germany with substantial accuracy. At the same time the considerable variations displayed in the table will suffice to explain divergencies from my scale of prices which may be within the experience of individuals. They suggest caution in generalizing from insufficient data.

By putting the prices and the given expenditure together it is easy to see how much food German working-class families live upon; but a detailed comparison with corresponding English households might be misleading. The amount of food bought or consumed is not the same thing as the amount of nourishment extracted from it, which is one of the numerous objections to laying down a standard of quantity as necessary for physical efficiency. Vital processes are far too subtle to be put into a chemical formula; they can not be judged by results. Having closely observed many thousands of German workmen in and out of the workshop, I can say with conviction that they are hearty, well-nourished men, and that their children are well kept and well cared for. Parents are very seldom wasteful or self-indulgent. The mothers have the knowledge and the will to make money go as far as possible. The condition of the working classes in respect of food has greatly improved during the last half century, and particularly during the last twenty years; for, while wages have increased steadily, the cost of food has not. The following table shows the consumption per head of the two most important kinds of meat—beef and pork—in the Kingdom of Saxony:

Meat consumption per head, in kilograms (2.2 pounds each) in Saxony.

Year.	Beef.	Pork.	Year.	Beef.	Pork.
1850.....	7.1	11.8	1880.....	11.1	18.1
1860.....	9.0	13.2	1890.....	14.0	20.6
1870.....	9.0	13.6	1900.....	15.2	27.9

The movement of wages and food prices is shown by some interesting tables prepared for the Düsseldorf Exhibition on behalf of Krupp's Essen works, and recently quoted by the Essen Chamber of Commerce. I have given the wage list since 1880 in a previous article dealing with that subject, and I will here reproduce the comparative table showing the proportional rise or fall in the prices of bacon, beef, veal, potatoes, and rye bread, as sold at the cooperative stores, parallel with the average daily wage. The starting prices are those of 1871 (for meat, 1875) and are taken as 100; the subsequent years show the movement upward or downward from 100:

Movement of wages and food prices in Germany, 1871-1900.

Year.	Bacon.	Beef.	Veal.	Potatoes.	Rye bread.	Wages.
1871.....	100	100	100	100	100	100
1875.....	106	100	100	70	93	128
1880.....	109	105	104	99	111	105
1885.....	102	109	104	76	89	120
1890.....	121	115	106	74	87	130
1891.....	106	118	109	106	106	133
1892.....	110	118	104	93	108	134
1893.....	107	110	98	60	83	135
1894.....	106	113	102	65	77	134
1895.....	100	118	110	74	72	135
1896.....	96	112	105	66	75	139
1897.....	107	109	108	75	79	147
1898.....	116	109	115	78	85	150
1899.....	104	109	121	73	85	155
1900.....	102	111	121	69	88	157

This table has been quoted to prove that under the protective tariff, namely, from 1880 onward, wages have steadily risen, whereas they merely fluctuated before, and that the cost of food has not risen in a corresponding degree. That is true in fact; wages in 1900 were 52 per cent higher than in 1880, the cost of beef and veal was 6 per cent and 17 per cent higher, but that of bacon was 7 per cent, of potatoes 30 per cent, and of rye bread 28 per cent lower. The inference to be drawn is that wages may rise under a protective tariff, but that other factors are more important in determining the price of food.

Cooperative stores play a perceptible part in supplying the necessities of life to the industrial classes in Germany, though they have not attained so large a development as in England, where they originated. Systematic cooperation was started by Schulze, of Delitzsch, in 1848, and the credit of inaugurating this form of social effort belongs therefore to Germany; but the stores or retail distributive societies, which were copied from the example of Lancashire, came many years later and have never formed more than a minor part of the movement, which has developed chiefly in other directions, whereas in Great Britain the opposite has occurred. The retail societies are there about ten times more numerous than the other forms of coopera-

tion practiced—namely, productive and agricultural societies—and credit societies, which are by far the most numerous and important in Germany, do not exist at all. It is necessary to make this explanation because the term cooperation is very loosely used, and some misapprehension might be caused by mixing up the different kinds of societies. In the present connection I am only concerned with the stores.

They are very much in evidence in the industrial towns, and they appear to be chiefly engaged in the sale of groceries. No doubt they have the effect, as with us, of keeping down the prices of the ordinary shops in their neighborhood, and they are disliked accordingly. There is not very much exact information available about their activity. According to the figures produced at the last cooperative congress there are in Germany 1,528 such societies. Of these, 568 are affiliated with a general association of cooperative stores, and they have 522,516 members. It is reckoned from this that the total membership is between a million and a million and a half families. The societies are regulated by statute and may only sell to members. The "Christian" trade unions have been particularly active in founding them. I do not know if the foregoing figures include the stores attached to individual works or not. There are such at Bochum, Aachen, Essen, Oberhausen, Bielefeld, Metlach, München-Gladbach, Leverkusen, and many other places, all in connection with large manufacturing concerns and run for the benefit of the operatives. By far the largest is that carried on by Krupps. It includes a huge establishment just outside the steel works at Essen and branch shops at all the workmen's colonies, the coal pits, and other works belonging to the firm. In 1900 there were in all 51 shops, thus apportioned: groceries, 20; butcher shops, 15; clothing and drapery, 11; boots and shoes, 3; hardware, 1; wine, etc., 1. This immense concern sprang originally out of a cooperative society carried on in Essen by workmen chiefly employed at Krupp's steel works. It fell into difficulties and was taken over with its liabilities by the firm in 1868. At that time it consisted of 3 grocery stores. Its operations extended rapidly after 1870 and again after 1895, particularly in the meat department. The number of slaughterhouses and butcher shops nearly doubled between 1895 and 1900.

The concern is carried on as an independent business with its own capital and on business lines. Membership is open to other persons besides those employed by the firm; but since 1890 the latter have enjoyed the advantage of an annual bonus on the total profits reckoned on the extent of their purchases, which are entered in an account book. The average bonus paid to workmen members in 1899 was 36 shillings [\$8.76]. The result of this system has been a large increase in the membership of Krupp work people and a falling off of outside members. Every personal and household requisite is sold, including all kinds of clothing, furniture, domestic machines, and even ice. About 1,400 blocks of 30 pounds each are manufactured every day. In two of the workmen's colonies markets are held for vegetables, meat, and fish. About 700 people are employed in the stores, and among them are many members of workmen's families. An idea of the extent of the operations may be gathered from the following details for the year 1901: In the butcher's department 2,298 oxen, 2,246 calves,

1,053 sheep, and 11,664 pigs were slaughtered; in the bakery 2,354,285 pounds of bread, 12,317,742 rolls and buns were baked; in the grocery stores 741,336 pounds of potatoes, 1,033,681 pounds of flour, 232,664 pounds of margarine, 160,978 pounds of butter, 160,585 pounds of coffee, 335,627 pounds of sugar, 231,120 pounds of soft soap, 77,145 pounds of soda, 407,900 pounds of petroleum, and 4,000 tons of coal were sold, to mention only a few of the principal articles. Great pains are taken to insure the quality of the goods. The aim of the management is not cheapness, but the provision of a good article at a fair price. I purchased a pair of braces, of which I happened to be in need, at the stores for half a crown [61 cents], and I have never seen better.

10. AMUSEMENTS, CULTURE, DRINK, AND GAMBLING.

AMUSEMENTS.

Amusements play a comparatively small part in the lives of German work people, and such as they have are mostly confined to Sunday. Games have not taken hold of them; they go to no football or cricket matches, although there are matches, and other classes in Germany show a growing taste for games and sports. I went to see a football match between Düsseldorf and a neighboring manufacturing town. It took place on Sunday afternoon. The day was fine and the ground very handy to both towns. A similar match anywhere in manufacturing England would have attracted from 10,000 to 20,000 sons of toil, who would have shouted themselves hoarse from beginning to end. At the German match not one put in an appearance. When I left the field toward the close of the game the spectators, who had slowly increased during the afternoon, numbered exactly 65. They were not workingmen, and they showed no excitement whatever. I noticed a curious difference in the behavior of spectators and players. In England the former keep up an almost continual noise, shouting at nearly every kick, and bursting into a prodigious roar when a good point is made; the players, on the contrary, maintain an almost unbroken silence. It was just the opposite in Germany; the spectators only raised a feeble sound when a goal was kicked, and for the rest were silent, but the players called out incessantly, directing, exhorting, and reproaching each other. They played the association game, not very well. The national game in Germany is kegel, a kind of skittles, and it is played at public houses, but not by workingmen, or seldom by them. They play cards sometimes, but not a great deal. In short, games may be ruled out as an item in industrial life.

Theaters and music halls count for more, but for nothing like so much as in England and in America. They are less numerous in proportion to population, and are only visited by the working classes to a limited extent on Saturday and Sunday. Sunday is the great day; there are always two performances, in the afternoon and evening, and sometimes one in the morning at 12 o'clock as well. The audiences are very large, but consist chiefly of the bourgeois class. The places most frequented by workingmen are the small, cheap music halls. The entertainment given at German music halls closely resembles the English "variety" show, and often includes English performers. The variety stage is indeed becoming nearly as international as the opera. I have seen some very witty entertainments at these places in Germany, and some rather offensively gross. Some of the newer music halls are magnificent; far more spacious and comfortable than anything of the kind in England or America. There is one at Düsseldorf which seats some 4,000 people or more, and does it handsomely, with tables, ample elbowroom, wide spaces everywhere for walking, and an excellent view of the stage from all parts. The prices are moderate, from

6d. [12 cents] up to 3s. [73 cents]. This is one sort of hall; the patronage of the working classes would not keep it going for a week. Another sort is a room of moderate size, not resembling a theater, but fitted with a small stage. The entrance fee is a few pence. Here the workmen come on Sunday, but not in large numbers. Drink is always, and food generally, served in the music halls.

The theaters proper in industrial towns are always run by the municipality. Every large town has one and no more, but those of middle size generally do not. For instance, München-Gladbach, with 60,000 inhabitants, has no regular theater, and it may be taken, as a rule, that towns below this size have no place of entertainment at all. In England little manufacturing towns of 20,000 or 30,000 inhabitants, such as Bilston in the black country, or Fenton in the potteries, generally have a theater, which is entirely supported by the laboring classes. The spectacle, which may be seen night after night in every industrial town, of galleries crammed with boys, in music halls, smoking cigarettes, is unknown in Germany. They are brought up to do something better with their money. The municipal theaters have stock companies and very varied repertoires; they include serious opera of all nationalities, comic opera, Shakespeare, modern dramas, comedies, and lighter pieces, such as farces and charming fairy tale pantomimes. No piece is played twice running. A high aim is maintained in the choice of works. A new play of Hauptmann or Suderman will be mounted as soon as possible at every municipal theater in the country. Last winter Monna Vanna was being played twice a week or more in every large town I visited, and Madame Maeterlinck herself was touring in most of them. The performances are generally of fair merit. A mathematician in Cologne recently calculated the cost of the municipal theater there, and found that the town pays an average of 10½d. [21 cents] to each spectator at every performance.

The principal public amusements of the German working classes appear to be dancing, sitting in the parks in summer, and listening to bands. The dancing is carried on in public houses, generally at some popular resort in the neighborhood of a town, and takes place on Sunday evening. I have visited some of these dancing rooms, and have found a large hall connected with the public house, in which a number of young people were dancing, while others sat at tables and drank beer. It was all highly decorous, and not in the least exciting. The parks have been mentioned previously in the descriptive articles. Most of the larger towns have public gardens, woods, playgrounds, or parks; they seldom possess the natural advantages of abundant grass and verdure which give their character to English parks, but they are pleasant and occasionally charming. There are also, a little farther afield, many resorts of a more rural character, to which easy access is provided by electric tram or rail.

CULTURE.

Libraries of one kind or another for the benefit of the people are plentiful. Municipal libraries are less numerous than in England and are still in an early stage of development, but they exist in most of the larger industrial towns. The following details of some selected cases will be of interest to librarians and others: Düsseldorf has three municipal libraries and one reading room. In 1901-2 the three libra-

ries contained 9,840 volumes, and loaned 86,291 volumes to 5,671 readers. Of the total number of readers, 1,975, or considerably more than one-third, were laborers, factory hands, and artisans, and 1,935, or another third, were women. Of the volumes loaned, 80 per cent were of "schöne Literatur," which includes poetry, essays, and fiction. The reading room was used by 33,080 persons, of whom 30,787 were males—an average of 98 per diem. This reading room is provided with six daily papers—a new and unusual departure. As a rule German free libraries do not keep newspapers, which perhaps accounts for the very large number of journals published in these towns. Aachen has one municipal library and a reading room. The number of volumes in the library is not stated, but, in 1900–1901, 6,795 were loaned to 4,317 readers, of whom the immense majority belonged to the cultivated classes. Only 62 workmen are put down on the list of readers; the rest were professional men, teachers, students, merchants, etc. The reading room was used on 271 days by 4,307 persons, or 16 persons a day. They consulted about 6,500 volumes. Chemnitz has one municipal library and a reading room. The number of volumes in the library is not stated, but, in 1901, 7,517 were borrowed by 857 readers, consisting almost entirely of professional men, students, and teachers. The reading room was used by 5,482 persons. Crefeld has one municipal library and reading room, but apparently books are not loaned at all. The annual report makes no mention of them. In 1901 the reading room was used by 5,315 persons, among whom were 715 artisans and superior factory workmen; the rest were chiefly students, teachers, and merchants.

To any one at all acquainted with the public libraries in corresponding towns in England, these figures will appear surprisingly small. Bolton, for instance, is a purely manufacturing town, considerably smaller than Düsseldorf or Chemnitz, and about the size of Aachen. It has five free lending libraries and reading rooms and one reference library, which contained 119,026 volumes in 1902. There is also a subscription library. The number of volumes issued to readers in 1901–2 was 204,998. There were 69,862 readers in the reference library and 232,646 in the reading rooms. Out of 24,160 volumes called for in the reference library (and consequently serious works) 7,479 were consulted by artisans, 4,176 by cotton operatives, 121 by warehousemen, and 108 by bleachers, etc. Granted that Bolton offers an unusually favorable example of the English public library, still it is representative, and undoubtedly this institution occupies a totally different position in Germany. I may add that it does so in the United States also. English visitors, dazzled by the advertisements of millionaireshood, and by the art, so assiduously cultivated in the United States, of dressing the shop window, have swallowed a vast amount of nonsense about the free libraries there. Those in the industrial towns can no more compare with our own in extent and use by the people than can those in Germany. What, then, it may be asked, becomes of the superior cultivation of "the masses?" Several answers may be returned to that question. One is that the superior intelligence and cultivation of "the working man" in Germany or America have no real existence; but that belongs more properly to the subject of education. Another answer more pertinent to the question in hand is that municipal libraries in Germany are largely supplemented by others to which the working classes have access. There are the

people's libraries founded by the Home Mission and numbering over 10,000; there are school and traveling libraries, which serve rural districts in particular; the libraries supported by the Society for Promoting Popular Culture, and others maintained by workingmen's organizations, especially those of a religious character. They consist primarily of reading rooms, to which libraries gradually attach themselves. Much activity has been displayed in this direction in recent years, particularly in Catholic communities. The one at Bonn may be mentioned as a good specimen. In 1901 it issued 27,092 volumes and had some 16,000 readers in the reading room.

The Catholic Society of St. Carl Borromäus, founded nearly sixty years ago, exercises a widespread influence in the dissemination of good literature and the support of local popular libraries. Finally, there are libraries attached to a good many works and factories. Here once more the name of Krupp is prominent, and some interesting details are forthcoming from Essen. The library was only opened in 1899, but by March, 1902, it already contained 29,000 volumes and the total loaned for the previous twelve months amounted to 208,793. The classification of books borrowed shows that 52.9 per cent belonged to "schöne Literatur," 27.5 to books for children, 2.5 to geography and travels, 2.44 to history, 2.03 to trade and industry; the sections least in demand were law and politics, literary criticism, philosophy, and biography. The ten most popular authors among readers of the working class came in the following order: Schiller, Lessing, Kleist, Hans Hoffmann, Gotthelf, Dickens, E. T. A. Hoffmann, Scott, Goethe, and Anzengruber, surely a very creditable list. Translations from the classics were in steady demand. The number of readers was about one-third of those employed at the works—76 per cent were workmen and 21 per cent officials. The library is administered with extreme care and much ingenuity in practical details. The system is well worth the attention of public librarians.

The list of the most popular authors just given shows that "schöne Literatur" by no means corresponds with the modern fiction, which accounts for the great bulk of the books issued by our free libraries. Schiller and Lessing are a little above Miss Corelli and Mr. Caine, with all due deference to the commanding genius of those writers; and the facts disclosed suggest that yet another reason for the comparative smallness of the German free libraries is that they are much more select. So long as the chief function of our own is to purvey novels to the daughters of artisans and tradespeople we shall do well to refrain from glorying too much in them.

Closely associated with the subject of libraries is that of newspapers. The number published in industrial towns is many times greater in proportion to population than in England. For instance, Chemnitz has 13, Essen 22, and Düsseldorf 29. This includes daily and weekly journals of all kinds. But towns of the same size and class in England never have more than four or five, and often less; their principal daily papers are halfpenny evening ones with "all the winners." One of the reasons why German towns can support so many papers probably is that, having no public news rooms, people buy more. Another reason is a greater distance from the large centers and capitals, and consequently more dependence on themselves for news. Berlin papers, it is to be noted, have not the same position in Germany as those of London have in England, those of Paris in France, those of Vienna in Austria,

or even those of New York in the United States. Here, again, Berlin does not represent the best of Germany. This is especially true of its comic papers, which have attained an unrivaled preeminence in all that is gross and base, unrelieved by wit. The German provincial papers, at the head of which are the *Kölnische Zeitung* and the *Frankfurter Zeitung*, are at their best extremely well informed and well written. The *Kölnische Zeitung* is undoubtedly the most influential provincial paper in the world. None is so often and so widely quoted. Single copies of newspapers are dear; that is to say, they give very little for the money. Nevertheless, they are much read by the working classes and play a large part in the intellectual life of the people.

In connection with culture I must not omit to mention the choral societies among work people. They are not more numerous or more proficient than in Yorkshire, but they are more general in Germany than in England and provide much enjoyment for leisure hours.

There are many other things bearing on this side of industrial life which I should like to discuss, but the small remaining space in this article must be devoted to the wasting of money on unprofitable or harmful things.

DRINK AND GAMBLING.

Some information is available on the subject of drink, but it really tells very little. The truth is that although "alkoholismus" has recently become one of those numerous topics on which educated Germany loves to pour forth a ceaseless torrent of pamphlets and books, drunkenness has not hitherto attracted the sort of attention that leads to the collection of solid facts. Thus it is that the police returns for the most part make no mention of drunkenness, but such cases as occur come under the head of "misbehavior" or "gross disorderliness." Under this head, therefore, one has to fall back on observation, which is worth something, but does not permit of any exact comparisons. The precise information available relates to the consumption of liquor and the number of licensed houses.

The British board of trade occasionally publishes a return showing the production and consumption of alcoholic liquors in different countries. According to this return, the consumption per head for the German Empire in 1898 was: Wine, 0.77 gallon; beer, 27.1 gallons; spirits, 1.85 gallons. In the United Kingdom the corresponding figures were: Wine, 0.41 gallon; beer, 31.9 gallons; spirits, 1.03 gallons. This really tells one very little about the habits of the people. If consumption were a safe guide, Germany would be a more drunken country than England, for wine and spirits are both much higher, while beer is but little lower; but that conclusion can not be admitted. The explanation is that drinking is more diffused in Germany; all classes drink alcoholic liquors as a regular thing. Very likely they drink "more than is good for them." Those persons who always know what is good for others are at liberty to say so, and do, in fact, say so; but the only positive conclusion to be drawn from the figures of consumption given above is that the Germans are a drinking nation. It further appears from the figures for previous years that the consumption of beer has considerably increased (from 19.8 gallons in 1885) and that of wine considerably diminished (from 1.94 gallons in 1885 and 2.29 gallons in 1896). Such variations, however, may be purely accidental. The amount that middle-class Germans can drink upon occa-

sion is astounding. During the three days' carnival revelry in 1903 there were drunk at the Breidenbacher Hof in Düsseldorf—a very charming but not a large hotel—about 10,000 bottles of wine; so I was informed, and, as an eyewitness, I can believe it; but I saw no one “overcome,” as the saying is.

With regard to the number of liquor shops, I can give the proportion to the population in a number of manufacturing towns in the Rhine Province: Barmen, 1 to 297; Cleve, 1 to 183; Crefeld, 1 to 274; Düsseldorf, 1 to 394; Duisburg, 1 to 272; Elberfeld, 1 to 320; Essen, 1 to 437; Kettwig, 1 to 311; Steele, 1 to 240; Werden, 1 to 253; Geldern, 1 to 132; München-Gladbach, 1 to 273; Rheydt, 1 to 402; Viersen, 1 to 103; Mülheim, 1 to 235; Neuss, 1 to 222; Oberhausen, 1 to 426; Romscheid, 1 to 203; Ruhrort, 1 to 172; Solingen, 1 to 141. From these figures it will be seen that public houses are pretty thick on the ground in this district. In the smaller towns and villages they are much more numerous in proportion to population; in many of them there is a public house to every 70 or 80 inhabitants. If drunkenness bore any direct relation to the number of public houses the state of the entire countryside would be “appalling.” For the sake of comparison I will give the proportion of all licenses (including grocers) to population in a few similar towns in Lancashire and Yorkshire in 1896. The German figures only refer to “on” licenses. Accrington, 1 to 328; Blackburn, 1 to 254; Bolton, 1 to 235; Burnley, 1 to 323; Bury, 1 to 275; Oldham, 1 to 283; Preston, 1 to 232; Bradford, 1 to 246; Halifax, 1 to 232; Huddersfield, 1 to 287; Leeds, 1 to 345; Sheffield, 1 to 176. If the “off” licenses be deducted, the English figures are much more favorable; the proportion for Sheffield, for instance, would be 1 to 273. Public houses are certainly more numerous in Germany, and often very close together in low parts of the towns. They are licensed by the local authority, which has power to refuse applications, but rarely does so to persons of respectable character. There are no statutory hours of closing and the law distinguishes between public houses and superior establishments where liquor is sold. The former generally close at 10 or 11, whereas superior places are often open till 2 or 3 a. m., and some cafés never close at all.

The upshot of all this is that opportunities of drinking are very abundant. Do the working classes, then, drink very much? Individuals do, but I am satisfied that, as a body, they drink very much less than our own; the married men can not afford it, and so set the younger ones a better example. But they have a large share of habitual inebriates in Prussia and North Germany generally; their appearance is unmistakable, and, as luck would have it, I saw a good many of them. I had not been in Crefeld more than ten minutes when I saw three men come staggering down the main street. I turned to watch what the policeman standing at the crossing, to whom I had been talking, would do. When they got there he was carefully looking in another direction. Thus is human nature ever the same, even in a Prussian policeman. It was Monday and the forenoon; “blue Monday” is a recognized institution in Prussia. The drunkards are drinkers of schnapps, which is plain, rectified spirit, identical with Swedish brandy, and what is called whisky in English public houses. At Solingen, I had a similar experience, and at Aachen the first man I spoke to outside the station was a chronic drunkard, reeking of schnapps. At Düsseldorf I frequently went into the old quarter of the town, which

was near my hotel, and seldom without seeing one or two men intoxicated. But too much stress must not be laid on such chance encounters. These towns contain many Poles who have migrated in search of work. The Slavs are spirit drinkers, and the men I saw might have been of this race; they generally had a dilapidated appearance, which I have never seen among regular German workmen, who manage to maintain a remarkably high standard in this respect, even when in misfortune. I have seen hundreds of men out of work at the labor information offices in Berlin and other towns; they were never dilapidated, but always well clothed and of good appearance. It is probable that higher wages and increased prosperity in recent years have been accompanied by increased expenditure on drink, but the broad conclusion I draw from such evidence as I have been able to gather is that this item is not as yet a heavy charge on the pockets of the industrial class at large. In Saxony the great bulk of the men are certainly frugal and abstemious, judged by the English standard. The women do not frequent public houses and do not take drink even when offered them; it is considered bad form. This fact has much influence on the habits of the men. Nothing differentiates these islands from other countries in the matter of drink so much as the conduct of the women. The practice of frequenting the public house and taking their children with them is not new and not increasing, as commonly supposed; it goes back for centuries, and it seems to be peculiar to us.

If German workingmen spend comparatively little money on drink, they waste still less on gambling. There is no horse racing, betting, or bookmaking, and the safety valve of State lotteries, which all the efforts of reformers have failed to abolish, is now so arranged as to be as little seductive as possible to the poorer classes, particularly in Prussia. The system is that of the "class lottery," in which the number of chances is too small and the price too high (from £7 4s. to £12 10s. [\$35.04 to \$60.83]) to permit of any general participation by the lower sections of the population. The traffic in small fractional chances, which used to be carried on by speculators, the enticing advertisements, and other means of exciting the gambling instinct have been prohibited. In effect the whole thing has been brought down to a State tax on a middle-class luxury. Other States are less austere than Prussia, and their lotteries consequently have a wide circulation beyond their own borders. But the system is the same in its main features, and I think it may be concluded that, though lotteries have much increased in recent years, they touch the laboring classes but little. Sometimes a number of men club together and buy a tenth, but the drain on their pockets is small. When told that they are throwing their money away they reply that "the hope is worth it." And who shall say it is not? After all, hope is still an element of some value in human life, and it may be worth an occasional modest outlay. The virtue of prudence, when carried too far, dries up the soul and becomes a particularly mean and sordid vice.

II. WORKMEN'S INSURANCE.

IMPORTANCE AND CLASSES OF INSURANCE.

Workmen's insurance in Germany is a subject so large and complex that anyone might well be excused for shirking it. One of the most industrious and accomplished of insurance statisticians, attached to one of the largest insurance businesses in the world, having a suite of offices and dozens of clerks under him, and being himself of German origin, confessed to me the other day that he had tried to understand it but could not. It is, however, so important an element of industrial life that it can not be omitted. Any account of labor conditions or labor legislation in Germany would be so defective without it as to be merely misleading. It is impossible to doubt that the general well-being of the working classes, which is strikingly visible to the eye and provable by vital statistics in spite of many unfavorable circumstances detailed in these articles, is in a large measure due to that remarkable system of insurance which is made up of compulsory thrift, State aid, and recognition of the liability of employers. The greatest causes of poverty are sickness and infirmity; it is the function of this insurance to counteract them, and no doubt it does. I presume that the most advantageous part of it to the workmen lies in the contributions of the employers and the State, unless there is some scheme by which any profits arising are divided. Excepting life insurance, which is a form of investment, ordinary insurance is economically indistinguishable from betting; the insurer bets that he will have a fire or an illness or an accident, or whatever it may be; the insurance office lays long odds that he will not; and since the office takes care to calculate the chances in its favor, they are against the insurer, who must expect to pay his share of the profits made by the insurance company. What he really buys is freedom from anxiety. But State insurance stands on a different footing, and when some one else pays the premium the insurer clearly stands to gain. That is the case with the German workman; and in so far as he contributes himself the insurance is a form of compulsory thrift which has a good moral influence, even if he never has occasion to draw the insurance money. Presumably those who do pay the premium are buying the efficiency and contentment of labor. Whether they get their money's worth or not is another question, to which I shall return after giving an outline of the main provisions of the system.

There are three branches of compulsory workmen's insurance: (1) sickness; (2) accident; (3) infirmity or invalidity. The first is directed against temporary incapacity through illness, the third against permanent incapacity through old age or chronic infirmity, while the second comes between them and partakes of the nature of both. It provides prolonged maintenance and means of restoration in temporary disablement through accident, permanent maintenance in permanent disablement from the same cause, and assistance to widows and

orphans in case of death. In the last point it goes beyond the age and infirmity allowance, which ends with the life of the insured; on the other hand, it only covers accidents sustained in the course of occupation, whereas the old age and infirmity provision covers all cases.

SICK INSURANCE.

General compulsory insurance of workmen against sickness dates from 1883. Previously such insurance has been to some extent regulated by law, and provincial governments possessed the power of making it compulsory; but for the most part it remained voluntary, and was effected through registered societies. The law of 1883 made it compulsory on all persons in a dependent position working regularly for wages in manufactures, commerce, and trades; and further gave local authorities the power to make it compulsory on other classes not coming under this description, such as persons temporarily engaged, apprentices, domestics, and agricultural laborers. The law has subsequently been amended and extended. The insurance is effected through a number of different channels, some public, others private. The idea is to encourage the internal administration of the business by those who have a common interest either of locality, occupation, or class. Consequently different branches of industry—mines, manufactures, building trades, and hand trades—have their own series of insurance funds, which may be single or associated in larger or smaller groups; and there are also the old registered societies. All these form specialized branches of insurance. Then, to cover the remaining industrial population, there are general public insurance funds established for the separate localities, grouped in districts (Ortsversicherung); and if these are inadequate the local corporation itself becomes the insurance office (Gemeinde-versicherung). Each individual need only be insured in one office. The aggregate number of authorized sick insurance funds in the Empire is over 23,000, and of persons insured in them between nine and ten millions. The rate of contributions depends on the rate of earnings. It varies from 2 to 3 per cent of the average earnings of each class of workmen; but in the case of the Gemeinde-versicherung it is from $1\frac{1}{2}$ to 2 per cent of the wage customarily paid in that locality to the ordinary day laborer. Two-thirds of the amount is payable by the person insured and one-third by the employer. The benefit is payable for not more than thirteen weeks; it includes medical treatment, drugs, etc., free, and sick pay beginning from the third day of incapacity, or free treatment in a hospital with half-pay for the sick person's family. Mothers are entitled to the same for four weeks after confinement. The legal minimum of sick pay is one-half the previous earnings.

The following table gives the chief statistical details for the last six years:

Statistics of sick insurance in Germany, 1896–1901.

Year.	Persons insured.	Cases of illness.	Days of illness.
1896.....	7,944,820	2,763,757	47,608,226
1897.....	8,337,119	2,964,937	51,513,783
1898.....	8,770,057	3,002,593	53,201,173
1899.....	9,155,582	3,476,067	60,406,683
1900.....	9,520,763	3,679,285	64,916,827
1901.....	9,641,742	3,617,022	66,652,488

Statistics of sick insurance in Germany, 1896-1901—Continued.

Year.	Revenue.		Contributions.		Payments.	
	<i>Pounds.</i>	<i>Dollars.</i>	<i>Pounds.</i>	<i>Dollars.</i>	<i>Pounds.</i>	<i>Dollars.</i>
1896	7,790,491	37,912,425	6,332,810	30,818,620	6,112,689	29,747,401
1897	8,390,503	40,832,383	6,774,335	32,967,301	6,699,989	32,600,684
1898	9,025,130	43,920,796	7,282,030	35,340,669	7,144,571	34,769,065
1899	9,734,104	47,371,017	7,735,570	37,645,152	8,084,980	39,345,555
1900	10,480,976	51,005,670	8,302,299	40,403,138	8,825,377	42,948,698
1901	(a)		8,567,663	41,694,532	8,902,959	43,326,250

(a) Method of reckoning changed.

ACCIDENT INSURANCE.

The State system of insurance against accident belongs to the same period of social legislation as the sick insurance. Both were due to the action of Kaiser Wilhelm I, who took a profound interest in the subject, and persisted, no doubt under the advice of his chancellor, in urging legislation upon the Reichstag in a series of royal messages until the difficulties were overcome and the project passed into law. This was accomplished in regard to accidents in 1884, after some previous unsuccessful attempts. The law then passed was extended in 1885, 1886, and 1887, and further amended in 1900. Previously compensation for injuries had been regulated by the liability act of 1871, under which railway servants were entitled to such compensation unless the employer could prove unavoidable causes (*höhere Gewalt*) or the fault of the injured, and persons employed in mines, quarries, and factories were entitled to it if they could prove negligence on the part of the employer or his representatives. The amount of compensation lay within the discretion of the court. That was all changed by the new legislation. The burden of proving liability rests now on the injured only in cases of intentional injury or for amounts exceeding the regular insurance payment. There are four classes of occupations—(1) industry, (2) agriculture, (3) building, (4) marine. These are all covered by one general law, but each has its own variations; and there are special provisions for (5) prisoners and (6) Government officials. "Industry" includes all workmen and officials with a salary not exceeding £150 [\$730] a year who are employed in mines, quarries, wharves, docks, factories, breweries, smelting works, wells, post and telegraph offices, railways, military and naval establishments; also bricklayers and masons, smiths, chimney sweeps, window cleaners, butchers, carmen, porters, cellarmen, and warehousemen. The other insurance classes do not concern us. Insurance is effected through trade associations of employers formed in specified districts, larger or smaller. These corporations have a legal personality and considerable powers of self-government. Every employer affected by the law is a member of the local association embracing his trade. Disputes fall within the jurisdiction of local arbitration courts, and the whole system is under the supervision of an imperial office which is composed of permanent and temporary members. The former, together with the president, are appointed for life by the Crown on the nomination of the Federal Council; the latter number eighteen, of whom six are chosen by the Federal Council, six are delegates of employers, and six delegates of workmen. The insurance funds are formed by contributions from the members of the trade associations in proportion to the salaries and wages paid in their business.

There is no claim for compensation when an accident is intentionally caused by the injured person; and the claim may be wholly or partly refused when the injured person has contributed to an accident by a criminal act or by intentional wrongdoing. Otherwise compensation is payable as follows:

(a) In case of injury—(1) free medical treatment, drugs, and any appliances medically required, such as crutches; (2) an allowance so long as the injured is unfit to work; in case of complete incapacity the allowance is $66\frac{2}{3}$ per cent (that is, two-thirds) of the previous annual earnings and is called “full allowance;” in case of partial incapacity it is in proportion to the impairment of wage-earning capacity sustained, and is called “part allowance;” (3) when the injured is rendered not only incapable of work but totally helpless, the allowance is increased up to the full amount of the earnings; (4) if the injured was already, at the time of the accident, permanently incapable, compensation is confined to medical treatment; but if such a person is thereby rendered totally helpless an allowance up to half the “full allowance” is payable; (5) so long as the injured remains out of work in consequence of the accident and through no fault the part allowance may be raised to full allowance by the association. Allowances begin after the lapse of thirteen weeks from the time of the accident. During that period the case comes under the sick insurance, which consequently deals with all minor injuries; but from the beginning of the fifth week it is provided that the sick pay shall be at least $66\frac{2}{3}$ per cent of the previous earnings, and if the sick fund to which the person belongs pays less than this the employer in whose business the accident took place has to make good the difference. If the injured belongs to no sick fund the employer has to take its place during the first thirteen weeks; or the association to which he belongs may fulfill this duty.

(b) In case of death the compensation is—(1) burial money of not less than 50s. [\$12], otherwise one-fifteenth of the annual earnings; (2) an allowance to the family, which varies, according to circumstances, from 20 to 60 per cent of the annual earnings. A widow is allowed 20 per cent until her death or remarriage, and each child 20 per cent until the age of 16; other dependent relatives may also get 20 per cent if in want; but the total allowances are not to exceed 60 per cent.

Some observations will be in place here. It will be noted that the burden of compensation for accidents is shared between the sick insurance, to which the work people contribute, and the accident insurance, to which they do not. And since all cases of injury come under the former, whereas many never reach the fourteenth week, when the accident insurance steps in, it may be and has been argued that too great a share of the compensation falls upon the work people themselves. The Social Democrats have urged that the burden should be differently divided, the employers paying the whole of the accident compensation and the employed the sick insurance. It appears, however, from the records of the ten years 1886–1895 that, though the sick insurance deals with many more accidents than does the accident insurance, the burden of compensation falls far more heavily upon the latter, because the cases for which it has to provide are the severe ones. Thus seven-eighths of the whole cost of accidents was borne by the employers' associations. The employers also provide one-third of the sick funds, so that altogether they defray 92 per cent of the acci-

dent charges. Further, it is found that of the payments made out of the sick funds only $6\frac{2}{3}$ per cent go for accidents and $93\frac{1}{2}$ per cent for sickness. Consequently the advantage accruing to the work people from the employers' one-third contribution to the sick fund is much greater than the disadvantage to them of having to pay a very small share of the accident money. Calculated out for the year 1897 the difference in their favor amounted to $35\frac{1}{2}$ million marks [\$8,449,000]; they actually contributed $112\frac{1}{4}$ millions [\$26,715,500], whereas under the Social Democratic scheme they would have paid $147\frac{3}{4}$ millions [\$35,164,500]. Another advantage accruing to them under the existing system is a certain degree of participation in the management of the employers' association. This takes effect in a matter of great importance to industrial welfare and efficiency, to which I have already referred when dealing with factory conditions. One of the duties of the trade insurance associations is to draw up rules for the prevention of accidents in factories, and in formulating such rules representatives of the workmen have an equal voice with the employers. I have quoted from one of these sets of rules and pointed out their influence in securing good order and clear gangways in the shops.

Statistics of accident insurance in industrial occupations.

Year.	Persons insured.	Persons injured (total).	Persons killed (total).	Persons permanently incapacitated.	Persons in receipt of compensation (total).	Compensation paid (total).	
						Pounds.	Dollars.
1900.....	6,928,894	51,697	5,108	592	310,105	2,929,360	14,255,720
1901.....	6,884,076	55,525	4,979	595	319,576	3,365,490	16,357,865

Year.	Persons injured.		Persons killed.		Persons incapacitated.					
					Permanently.				Temporarily.	
					Wholly.		Partly.			
	Total.	Per 1,000 insured.	Total.	Per 1,000 insured.	Total.	Per 1,000 insured.	Total.	Per 1,000 insured.	Total.	Per 1,000 insured.
1886.....	9,723	2.80	2,422	0.70	1,548	0.44	3,780	1.09	1,973	0.57
1887.....	15,970	4.14	2,956	.77	2,827	.73	8,126	2.11	2,061	.53
1888.....	18,809	4.35	2,948	.68	1,886	.43	10,270	2.28	3,710	.86
1889.....	22,340	4.71	3,382	.71	2,331	.49	12,788	2.70	3,829	.81
1890.....	26,403	5.36	3,597	.73	1,860	.38	16,102	3.27	4,828	.98
1891.....	28,289	5.55	3,634	.71	1,570	.32	17,481	3.42	5,094	1.19
1892.....	28,619	5.64	3,282	.65	1,607	.30	18,049	3.56	5,781	1.14
1893.....	31,171	6.03	3,589	.69	1,877	.27	19,740	3.82	6,465	1.25
1894.....	32,797	6.25	3,438	.65	835	.16	20,025	3.82	6,479	1.22
1895.....	33,728	6.24	3,644	.67	780	.15	19,312	3.57	6,992	1.25
1896.....	38,538	6.24	4,040	.71	595	.10	20,781	3.86	7,032	1.28
1897.....	41,746	6.91	4,252	.70	626	.10	21,247	3.92	7,032	1.28
1898.....	44,881	7.10	4,613	.73	538	.08	22,848	4.04	7,032	1.28
1899.....	49,175	7.39	4,772	.72	681	.09	23,807	4.28	7,032	1.28
1900.....	51,697	7.46	5,108	.74	592	.08	24,700	4.38	7,032	1.28
1901.....	55,525	8.07	4,979	.72	595	.09	26,158	4.80	7,032	1.28

These figures do not include the agricultural and State sections of the accident insurance system. The total number of persons insured in 1901 was 18,866,712; the number in receipt of compensation was 476,260; the compensation paid was £4,927,790 [\$24,900,083].

It appears from these tables that the percentage of accidents entailing compensation has steadily increased since 1886, both absolutely and relatively to the number of persons employed; but by far the

greatest part of this increase occurs in the class of minor injuries involving only temporary incapacity. Fatal cases have increased since 1894, and the annual average is higher than it was in the earlier years of insurance. On the other hand, there has been a marked diminution in the number of persons permanently and wholly incapacitated. The diminution is so great that it suggests some change of policy or classification, since it is not accompanied by a diminution of fatal accidents. On the whole, the figures suggest that insurance tends to increase accidents. The occupational groups in which accidents were most numerous in 1901 were: Carriers and carmen, 14.5 per 1,000; timber trade, 12.9; quarries, 12.4; mines, 12.2; building trades, 11; flour mills, breweries, and sugar refineries, 11; iron and steel, 10.1. In the textile industries the proportion was 3.5; in leather and clothing, 3.6; and in paper making and printing, 4.6.

INFIRMITY INSURANCE.

The infirmity law is the latest of the insurance provisions made for work people by the State, and it is the most comprehensive. It applies compulsorily to all persons over 16 years of age who work for wages or for salaries up to £100 [\$487] a year, with the exception of those Government and other public officials who are otherwise provided for. Persons in receipt of more than £100 [\$487] but not more than £150 [\$730] have the right of voluntary insurance. This law is a continuation of the previous legislation initiated under Kaiser Wilhelm I, who left the completion of the scheme to his successors. Its preparation was encouraged by Friedrich III during his brief reign, and was taken in hand energetically by the present Kaiser immediately on his accession. It was passed in its original form in 1889, but underwent considerable revision in 1899, when a new act was passed, which found favor even with the Social Democrats. Its object is to secure an allowance for infirmity or for old age. The condition for the first is incapacity to earn a living lasting at least 26 weeks, and for the second the completion of 70 years, whether accompanied by any infirmity or not. In addition it is required that in order to be entitled to either allowance the claimant shall have been insured for a fixed period, which is called the time of waiting; for an infirmity allowance it is 200 weeks, if 100 have already been paid, and 500 if they have not; for an old-age allowance it is 1,200 weeks. As part of such waiting time are reckoned the term of military service and any period of inability to pursue a trade through illness. The allowances are reckoned in five classes, according to the annual income of the pensioner—(1) up to £17 10s. [\$85]; (2) £27 10s. [\$134]; (3) £42 10s. [\$207]; (4) £57 10s. [\$280], and (5) over £57 10s. [\$280]. The old-age pension for each class is (1) £5 10s. [\$27]; (2) £7 [\$34]; (3) £8 10s. [\$41]; (4) £10 [\$49], and (5) £11 10s. [\$56]. The infirmity allowance is reckoned from the following basis for each class: (1) £5 10s. [\$27]; (2) £6 [\$29]; (3) £6 10s. [\$32]; (4) £7 [\$34], and (5) £7 10s. [\$36], to which an addition is made in proportion to the length of time during which insurance has been maintained, namely, 3pf., 6pf., 8pf., 10 pf., and 12pf. [$\frac{3}{4}$ cent, $1\frac{1}{2}$ cents, 2 cents, $2\frac{1}{2}$ cents, 3 cents], respectively, for every week. The allowances are paid monthly in advance through the post.

In addition to these main provisions payments are made under cer-

tain conditions on the occasions of marriage, disabling accident, and death.

The insurance fund is provided by regular payments, divided equally between employers and employed, which at present stand at 14pf., 20pf., 24pf., 30pf., and 36pf. (roughly, from 1½d. to 4½d.) [3 cents to 9 cents] a week for the respective classes. The State adds 50s. [\$12] for each allowance paid. The contributions are paid in by means of stamps, which are on sale at post-offices and are affixed to cards carried by the insured persons. The stamps are provided by the employer, who deducts half the value from the wages; they are affixed at the time of paying wages and are good for one, two, or thirteen weeks, according as wages are paid weekly, fortnightly, or quarterly. The insurance is administered by special offices or institutes, established for large districts or for whole States. Each has a president, who possesses the standing of a Government official, and a committee composed of an equal number of representatives of employers and employed (not less than five of each). Each insurance office has attached to it at least one arbitration court, with an independent chairman, nominated by the Government, and assessors equally representing employers and employed. General supervision is exercised by the imperial insurance office. For persons in the public service who come under the insurance law provision is made by means of special funds.

An important additional point is a provision for insured persons who are incapacitated by illness from earning their living. In such cases the insurance office is empowered to undertake the medical treatment of the sick person in a hospital or sanatorium, and if the person is subject to sick insurance the obligations of the latter pass to the infirmity insurance, which is reimbursed from the sick fund in proportion to the claims of the sick person.

Statistics of infirmity insurance in Germany.

NUMBER OF CLAIMS ALLOWED.

Period.	Infirmity.	Old age.	Sickness.
1891-1901 (11 years)	734,254	389,971	14,369
Period.	Marriage.	Accident.	Death.
1895-1901 (6½ years)	742,910	689	164,756

AVERAGE AMOUNT OF ALLOWANCES.

Year.	Infirmity.			Old age.			Year.	Infirmity.			Old age.		
	£	s.	Dollars.	£	s.	Dollars.		£	s.	Dollars.	£	s.	Dollars.
1892.....	5	14	27.69	6	7	30.87	1897.....	6	10	31.32	7	18	33.34
1893.....	5	18	28.65	6	9	31.35	1898.....	6	11	31.33	7	1	31.36
1894.....	6	1	29.43	6	5	30.39	1899.....	7	2	31.34	7	5	32.35
1895.....	6	4	30.15	6	11	31.87	1900.....	7	6	32.36	7	10	33.36
1896.....	6	6	30.63	6	13	32.31							

Statistics of infirmity insurance in Germany—Continued.

TOTAL PAYMENTS.

Year.	Infirmity.		Old age.		Sickness.		Marriage.	
	<i>Pounds.</i>	<i>Dollars.</i>	<i>Pounds.</i>	<i>Dollars.</i>	<i>Pounds.</i>	<i>Dollars.</i>	<i>Pounds.</i>	<i>Dollars.</i>
1900..	2,678,650	13,035,650	1,311,210	6,381,004	32,570	158,502	246,950	1,201,782
1901..	3,251,085	15,821,405	1,232,785	5,999,348	64,980	316,225	258,175	1,256,409

Year.	Accident.		Death.		Sanatoriums.		Total.	
	<i>Pounds.</i>	<i>Dollars.</i>	<i>Pounds.</i>	<i>Dollars.</i>	<i>Pounds.</i>	<i>Dollars.</i>	<i>Pounds.</i>	<i>Dollars.</i>
1900..	550	2,677	83,335	405,550	278,915	1,357,340	4,636,465	22,563,357
1901..	945	4,599	87,135	424,043	356,530	1,735,053	5,263,565	25,615,140

The foregoing bare outline of facts, without any complications, will give the reader unacquainted with the subject some idea of the character and scope of this gigantic system. Year by year its operations become larger, as the following summary figures for 1902 will show: On account of sickness, 4,800,000 persons received £10,300,000 [\$50,124,950] benefit; for accidents, 384,566 persons received £5,360,000 [\$26,084,440]; for infirmity, 1,100,000 persons received £6,050,000 [\$29,442,325]; total, 6,736,000 persons benefited to the extent of £21,700,000 [\$105,603,050]. In 1891 the total amount paid was only £2,030,000 [\$9,878,995]. The benefit has therefore increased more than tenfold in eleven years. Of the total amount £2,070,000 [\$10,073,665] was contributed by the State, £10,500,000 [\$51,098,250] by employers, and £9,100,000 [\$44,285,150] by the insured. That is to say, the work people received some £12,600,000 [\$61,317,900], or £35,000 [\$170,328] a day beyond the amount of their own contributions. That is really a very solid sum and a pretty heavy tax on employers in addition to the compensation for injuries. I said above that presumably what they are buying is the efficiency and contentment of labor, and asked if they get their money's worth. As an observer, able to regard the situation in perspective and without prejudice, I am strongly of opinion that they do. Take contentment first. The working classes are not contented, of course. Who is? But their discontent in the mass takes the mildest form of expression—votes for Social Democratic candidates in the Reichstag elections. I can not discuss the Social Democracy here at the end of an article, and will merely observe that its increasing success at the polls is not alarming, for as it succeeds it changes. Its power means something, no doubt; it means legislation in favor of labor, but it does not mean anything revolutionary. In spite of resolutions at congresses, the revolutionary programme is really as dead as the economic theory on which it is based. Like most other economic theories, it has been falsified by the course of events; and those who still believe in it—a dwindling band—are merely running their heads against the solid wall of facts, as such people will. The Arbeiter Frage will find no sudden and violent solution, but a gentle solvent; it will dissolve away, as all such questions do, and give place to another. That the growing strength of trade unions has taken this direction rather than that of interference in the shops is an advantage to employers worth more than can be estimated in money; and I have no doubt that it is in a

considerable measure due to the easing of circumstances and the mitigation of misfortune secured by the insurance laws.

With regard to the efficiency of labor, insurance has developed a very remarkable and unforeseen result. The prospect of having a great and increasing number of chronic invalids on their hands has stimulated the insurance offices and societies to a great preventive movement. It was found on investigation that consumption is the worst enemy; and about the same time the open-air cure was coming into vogue in Germany. The enlarged powers given by the infirmity insurance act of 1899 in regard to the treatment of sick persons encouraged the experiment of sending consumptive patients to sanatoriums, and the movement has grown with great rapidity. At first most of the insurance offices sent patients to existing sanatoriums and other cure establishments, but some began to build their own, and the demand increased so rapidly that the practice soon became general. According to the last report there are now between 70 and 80 sanatoriums, containing 7,000 beds, for the accommodation of working-class patients under the insurance acts. Allowing three months' treatment for each case, they claim the ability to undertake 30,000 cases in a year. The following results are reported:

Records of patients at sanatoriums of the insurance offices.

	Per cent.
Fully restored to work.....	67.3
Fully capable of other work.....	7.1
Partly capable of other work.....	14.6
Not able to earn living.....	11.0

Or, put in another way—

Cured or improved.....	87.7
Unimproved.....	8.7
Worse.....	3.1
Died.....	.5

There is at present great enthusiasm for a system which restores so many workers to a state of health, enabling them to earn their living, and the immediate gain to efficiency is obvious. How it will work out eventually remains to be seen. We are not told how long the improved health lasts, nor how many contract tuberculosis again. If reinfection is common, the cost may easily become greater than the funds will bear. The system by which all the funds work in with one another more or less is so complicated and the permissive powers under the acts are so elastic that the outcome can not be forejudged; it must be left to experience. The further and more obscure question of the ultimate effect of systematically preserving the susceptible and enabling them to propagate their susceptibility is too large to be discussed here, and too academical. The survival of the unfit is one of the general results of "civilization," but mankind can no more resist the power which draws in that direction than stop the ocean tides. One thing we know—the "ethical process" to which that impelling force is due can not be opposed to the "cosmical process," as Huxley confusedly put it; it must be part of it. But what is the cosmical process?

12. PAUPERISM.

THE POOR LAW.

The State recognizes the obligation of providing for the needy, but confines its direct action, save in cases of public disaster, to regulating and supervising the means, which are left in the hands of the local community. The guiding principle of the poor law is the moral duty and the political expediency of (1) preventing need and (2) mitigating its effects. It is administered, very much as is the English poor law, by local unions, which vary in size and composition in different parts of the country. In 1885 there were 47,368 unions, of which 1,238 were boroughs, 31,408 rural unions, 11,346 "estate districts," and 3,376 mixed districts. For the urban industrial population, with which these articles are concerned, the poor law authority may be taken to be the municipal corporation.

It might be thought that the system of State insurance, described in my last article, together with the numerous other institutions (many of which I have been obliged to omit) for the benefit of the poorer sections of the population, would have the effect of diminishing if not abolishing pauperism. Indeed, I have often heard it said that there is little or no pauperism in Germany, and the vast "workhouses" in England are commonly referred to as proof of the appalling state of things in our own unfortunate country. This is one of the many current delusions in such matters; it is on a par with the statement, which I have heard gravely uttered, that in Germany everybody is obliged to learn a trade. As a matter of fact, there is a great deal of pauperism in Germany, and the burden tends constantly to increase with the rising standard of living. What were considered superfluities become necessities.

It is said—and I have no doubt truly—that the workmen's insurance, though it may diminish the cost to the community in some respects, has increased this tendency, wherein we may see merely another illustration of the law that civilization means preservation of the unfit—whether they be invalids, paupers, lunatics, cripples, or criminals. In 1885 the number of persons in receipt of public relief in the German Empire was 1,592,000, or 3.4 per cent of the population. In England and Wales it was 2.6 per cent in the same year. The comparison is inexact, because a certain proportion of those who are reckoned in Germany as receiving public relief are provided for in other ways in England, by means of free hospitals and other institutions, but the figures will show how far from the truth is the notion that there is no pauperism in Germany, if by pauperism is meant public relief.

The local poor law authority is eventually responsible for the support of those needy persons only who have a legally defined claim on it. The claim is conferred by birth in the locality, by two years' continuous residence, or, in the case of a woman, by marriage. Current

relief given to other persons is recoverable from the union they come from, except in the case of illness of dependent persons at work for more than a week in the place, or of apprentices. In such cases the charges for the first thirteen weeks can not be recovered, but are defrayed by the union where the illness occurs. Strangers coming into a place may be turned out if unable to provide themselves either with housing or maintenance, or if they do not possess the capacity or the means to procure a livelihood. Needy persons, also, who require support for other reasons than a temporary incapacity to work may be returned to their own parish. The claim to relief does not constitute a right; it merely imposes a duty on the community.

The relief embraces shelter, food, medical care, and burial. It does not relieve relations, husbands, fathers of illegitimate children, and other persons legally responsible from any of their responsibility. Further, the law carefully distinguishes between voluntary and involuntary causes of destitution, and it seeks to prevent pauperism by punishing misconduct which conduces to it. The following are liable to imprisonment: (1) Tramps; (2) beggars and those who do not restrain their children from begging; (3) those who do not restrain them from theft, smuggling, and poaching; (4) those who bring themselves or persons dependent on them "upon the rates" by gambling, drink, or idleness; (5) who shirk the duty of maintaining those for whom they are responsible in spite of an official order; (6) who refuse to do work given them when in receipt of public support; (7) who fail to obtain work in a given time. We have nothing corresponding to the last class, the "culpably houseless;" and, generally speaking, the German law is much more severe on voluntary or intentional pauperism than our own.

They have a capital word, "work-shy," which is equivalent to "born-tired," and in dealing with the unemployed are accustomed to distinguish this class. They are certainly very successful in suppressing the tramp or "hobo"; I have only once seen one. I think that their attitude in these matters is a conspicuous illustration of that discriminating intelligence which is probably the most valuable and distinctive quality of the German mind. They do not mix things up. Recognizing that moral responsibility is the very foundation of society, they distinguish clearly between the culpable and the unfortunate, and do not allow sympathy with the latter to shelter the former, after the fashion which prevails a good deal in England and still more in America, and is due to the muddled thinking of emotional and ill-educated persons. Nor does this clear-sightedness entail any hardness of disposition. On the contrary, I have no hesitation in saying that, if there is in Germany less giving in the way of direct charity, there is far more general recognition and fulfilment of personal duty toward the poor than in England or America. To me it seems the worthier way and productive of better results.

The system embraces both indoor and outdoor relief, but the latter is far more extensively developed. It is thought better to keep the family together and to restore those who are able to support themselves at all, but have fallen into difficulties, by timely assistance than to encourage them to become total burdens on the community. Complete maintenance in a poorhouse is therefore reserved for the comparatively few who, by reason of age or infirmity, are totally unable to help themselves and have no other resources. The other helpless classes—orphans, lunatics, and other afflicted persons—are taken care

of in special institutions. The danger of abuse of outdoor relief can be avoided only by extreme care in its distribution, and when it is developed on a large scale a correspondingly large number of persons is required for its administration. If a paid staff were employed for the required personal investigation the cost would be excessive. This difficulty is met by the Elberfeld system, which has now been adopted, I believe, in all towns throughout Germany. The rural districts lie outside the scope of this inquiry, and I say nothing of them.

ELBERFELD SYSTEM OF OUTDOOR RELIEF.

A brief reference to the system has already been made in the article on Elberfeld. It is applied by dividing the union into districts, and subdividing the districts into beats; each beat is in the charge of a visitor or almoner who is a citizen of the town and unpaid. The division is so made that each beat contains from two to four cases requiring relief, and no more; and it is the duty of the visitor to make himself personally acquainted with their circumstances. As an illustration, I may as well take Elberfeld, where the system has been in force since 1853. In 1901 the population was 157,000, the number of districts 37, and the number of poor beats 518; the average number of cases of outdoor relief was 31.92 to a district and 2.28 to a beat. The number of citizens gratuitously giving their services was 564, and they represented the following callings: manufacturers and merchants, 215; architects, engineers, builders, and other employers, 167; officials, teachers, doctors, apothecaries, and lawyers, 146; landed proprietors, 10; other persons of independent means (Rentner), 26. Since the beginning of the present year there have also been two lady visitors with a roving commission.

In Düsseldorf there are 18 lady visitors. The almoners are nominated by the town authority, and are obliged to undertake the allotted duty. They pay periodical and regular visits to their quarters and investigate cases of need. In this they command the assistance of poor law medical officers employed by the corporation. An almoner finding a case requiring assistance through illness or disablement sends a form to the district medical officer, who examines the case and fills up the form, stating whether the individual is (1) permanently or (2) permanently but only partly or (3) temporarily incapacitated, and from what cause. The almoner may give a certain amount of relief on his own discretion, and larger amounts are passed for a limited time by a general meeting of the almoners of the district, but the eventual grant rests with the poor law committee of the town, to whom claims are submitted by the almoners. The procedure is very businesslike, and it is claimed that the system reconciles the philanthropic action of the individual with the dispassionate examination of facts demanded by responsibility to the public, and secures the advantages of both. For expert criticisms, the reader is referred to the report made to the local government board in 1888 by Mr. J. S. Davy, one of His Majesty's inspectors, Mr. C. S. Loch, and Mr. A. F. Hanewinkel.

Of course, everything depends on the administration; and about that I can only say that they are very well satisfied with it in Germany generally, and in Elberfeld particularly, after an experience of fifty years. The system entails no small sacrifice on the part of busy pro-

fessional men, and their firm adherence to it is a striking illustration of the strong sense of public duty entertained in Germany. A good many of the almoners in Elberfeld have performed this service for over twenty years, 17 of them for over thirty years, and two for over forty years. During the fifty years' experience there the annual cost of the outdoor relief has varied from 10½d. to 1s. 9½d. [21 cents to 43 cents] per head of the population; the average cost during the last ten years has been 1s. 6d. [36 cents] per head. The average number of persons in receipt of outdoor relief for the last ten years has been 7.28 per 1,000 of the population. Relief is given in money and in kind, in the shape of food, clothing, and bedding. Out of 2,269 cases relieved in 1901, nearly one-half, 1,072, received money alone, 139 received goods alone, and the rest received both.

In addition to the foregoing general assistance, the system of outdoor relief embraces medical attendance. In Elberfeld there are nine district doctors and two specialists, one for eyes, and the other for throat, nose, and ears. In 1901 they treated 4,919 cases. In September last a monument to the founders of the system was unveiled in Elberfeld, in celebration of the fiftieth anniversary of its adoption.

It will occur to some readers to ask whether an adequate supply of unpaid almoners is always forthcoming. As a rule it is; and though some difficulty is occasionally experienced in particular localities, the failure is exceptional.

INDOOR RELIEF.

I include under this term, not only poorhouses or workhouses, but poor law children, hospitals, institutions for lunatics, epileptics, deaf-mutes, the blind, etc., and night shelters for the houseless.

Workhouses.—These are on a small scale compared with ours, which is due to the larger use of the outdoor system of relief and also to the disposal in other ways of paupers requiring medical care and of casuals. The following figures, giving the number of inmates at the end of 1901, together with the population, in a few of the chief industrial towns, will sufficiently show the part played by this factor in German civil life: Düsseldorf (217,500), 666; Chemnitz (208,500), 132; Elberfeld (157,000), 249; Aachen (136,300), 406; Crefeld (108,900), 129. The discrepancies here shown must not be taken to indicate the relative prevalence of pauperism in the several towns so much as differences in the method and means of dealing with it. In some towns the public poorhouse is supplemented by others on a religious foundation. Crefeld, for instance, has two, with 86 inmates, of whom the town paid for 68. The workhouse paupers, therefore, were 197, not 129. For the sake of comparison I give the number in some corresponding English unions at the end of 1901: Sheffield (229,441), 2,031; Bradford (228,667), 1,125; Oldham (215,624), 1,033; Blackburn (223,520), 959; Rochdale (129,433), 761. The Düsseldorf workhouse comes nearest to the English type; it is called "Institution for Aged and Incapacitated Persons of Both Sexes"; at the end of 1901 it contained 309 men, 324 women, and 33 children.

Children.—Poor law children include those who are orphaned, deserted, neglected, and afflicted. The first two classes are under the legal guardianship of the union, and are taken into orphanages or boarded out in families. The great majority go into orphanages,

which are usually religious foundations. The union pays for their keep, but some unions have orphanages of their own, and there are a few State and provincial institutions of the kind. As a rule the orphanages are of moderate size, and some are arranged on the family or cottage system, which has been developed on such a large scale in England by Doctor Barnardo. The boarding out of children under 6 in private families is placed under the supervision of the police. Neglected children are those whose home conditions are injurious or whose character is bad. They are dealt with on the principle that it is both the duty and the right of the community to remove them from bad influences and subject them to good ones. They are sent to reformatories or to special schools, according to their age and circumstances. Afflicted children are provided for in the special institutions devoted to their malady. Children under school age, whose parents are unable to attend to them at home, are taken care of in public nurseries and minding establishments.

Hospitals.—In Germany there are no workhouse infirmaries for pauper patients; nor do general hospitals maintained by voluntary contributions, where poor patients can obtain gratuitous treatment without any touch of pauperism, exist to the same extent as in England. Most of the hospitals are self-supporting and make a charge for treatment. Patients requiring in-treatment, but too poor to pay, are sent to the hospital and paid for by the union. The cost is consequently a large item in the local poor law budget. The general hospitals originally rested on a religious foundation, and still do to a great extent; but most of the large towns have public hospitals of their own in addition, both general and infectious. A few figures will illustrate the system.

Poor law in-patients in 1901.

Hospital.	Patients.	Cost to the town.	
		English currency.	U. S. equivalent.
Düsseldorf:			
Marien Hospital.....	802	£3,105	\$15,110
Evangelical Hospital.....	530	2,082	10,132
Kreutzwesteren Hospital.....	92	234	1,139
City Barrack Hospital.....	1,243	2,596	12,633
Clinics, etc.....	121	390	1,898
Total.....	2,788	8,407	40,912
Elberfeld:			
City hospitals.....	1,526	4,280	20,829
St. Joseph Hospital.....	64	173	842
Bürger Hospital.....	4	11	54
Frauen Verein Hospital.....	3	14	68
Bethesda Hospital.....	2	1	5
Reformed Union Hospital.....	3	27	131
Eye hospital.....	21	28	136
Total.....	1,623	4,534	22,065

It is necessary to give these details in order to prevent erroneous conclusions which might be drawn from hasty comparisons of poor law expenditure in Germany and in England.

Asylums and other institutions for the afflicted.—These very much resemble our own county establishments. There are provincial asy-

lums and schools for deaf-mutes and the blind to which the local unions send their cases and are bound to pay at least two-thirds of the cost. There are also similar schools maintained by certain towns and by private persons to which cases are sent. A good many of these educational establishments are confessionally divided, like the elementary schools.

Shelters for homeless persons.—Many of the large towns provide a night's lodging and breakfast for homeless persons. This to a considerable extent takes the place of our workhouse casual department, but it is carried out in special shelters. In addition to this it has been found necessary in some towns during the recent depression in trade, through which many were thrown out of work, to provide lodgings for homeless or destitute families. Düsseldorf has a number of houses owned or rented by the corporation and devoted to this purpose. At the end of March, 1901, there were 818 persons so housed. These should properly be added to the indoor pauper population, as well as the inmates of the shelter, which accommodated an average of 42 persons every night. If this is done, the number of persons on the indoor list fully comes up to the English level. But the circumstances are somewhat unusual, and the pressure has been exceptionally great in Düsseldorf, as I have shown in the article on housing.

Tramps and beggars.—I have already referred to this class and their liability to imprisonment. They may be sent to jail or to a workhouse, properly so called—that is, a house of correction—for two years, with a view to reclamation. Another institution, intended for the same purpose, is the “workmen's colony,” which offers occupation to the “submerged” as a step toward reinstatement in life. There are nearly 30 such colonies in Germany. The first was founded by Pastor von Bodelschwingh near Bielefeld, in Westphalia. The Salvation Army in England has copied the idea.

SUMMARY.

It will be seen from this review of the modes in which pauperism is dealt with in Germany that no exact statistical comparison can be made with England, even if the materials were available, which is not the case. There are no comprehensive and uniform returns for Germany; one has to pick the numbers out of the annual reports for separate towns, and these are all made up in different ways. More comprehensive returns are available for England, but they, again, are made up in a different fashion. The matter is, however, so interesting that I will endeavor to make a comparison as well as the material will allow. And first, as to expenditure, I will take the cost of poor law relief per head of the population in a number of manufacturing towns as much alike in size and character as possible. The German towns are all in the Rhine Province, and the figures are taken from Harnisch's *Jahrbuch*; the English towns are in Lancashire and Yorkshire, and the figures are taken from returns prepared for the local government board:

Expenditure on pauperism per head of population in German and English towns, 1902.

German towns.	Expenditure.		English towns.	Expenditure.	
	English currency.	U. S. equivalent.		English currency.	U. S. equivalent.
	s. d.			s. d.	
Barmen	3 1½	\$0.75	Blackburn	1 11	\$0.46
Crefeld	4 10½	1.17	Bolton	2 2½	.53
Düsseldorf	4 5	1.06	Bradford	2 3	.54
Duisburg	2 11½	.71	Bury	2 1	.50
Elberfeld	3 6	.84	Halifax	2 2½	.53
Essen	3 10	.92	Huddersfield	1 9½	.43
M. Gladbach	4 8	1.12	Keighley	2 4½	.56
Mülheim	2 11½	.71	Oldham	1 10½	.45
Oberhausen	3 1½	.75	Preston	1 6½	.37
Remscheid	3 0	.72	Rochdale	2 9½	.67
Solingen	3 8	.88	Sheffield	3 2½	.77

The reader is warned against drawing conclusions from these figures. The accounts for the German towns represent the whole of their poor law expenditure; those for the English towns do not. The cost of lunatics and patients in hospitals, the salaries and keep of staffs, and repairs to buildings are not included. These omissions, of course, tell greatly to the disadvantage of the German towns, and it is impossible to say how the account might stand if they were made good. It is, however, clear that the expenditure in Germany is very heavy in some of the towns. The heaviest budget is that of Crefeld. Now the average number of persons in receipt of relief there in 1901 was, outdoor, 2,506; indoor, 642; total, 3,148, or 2.9 per cent of the population; and the cost per head was 4s. 9d. [\$1.14]. The English union on the list which comes nearest in point of size to Crefeld is Rochdale, and both are textile towns not unfairly comparable. The number of paupers at Rochdale on January 1, 1902, was, outdoor, 1,092; indoor, 916; lunatics, 259; total, 2,267, or 1.8 per cent of the population, which is very nearly the mean for all the Lancashire unions.

At Elberfeld the number of persons in receipt of relief at the close of the year 1901 was, outdoor, 2,978; indoor, 596; total, 3,574, or 2.27 per cent of the population. Unfortunately I have not been able to get the corresponding numbers for the other towns. Some do not publish an annual report, and others do not state the numbers in such a way that they are available for comparison. But if we take these two representative towns, Crefeld and Elberfeld, and compare them either with single towns in Lancashire and Yorkshire or with the means for those counties, we find that the total number of persons in receipt of poor law relief, including lunatics, is much smaller in proportion to population in England than in Germany. The percentages are, Crefeld, 2.9; Elberfeld, 2.27; Lancashire, 1.9; West Riding of Yorkshire, 1.7. It is clear, therefore, that the higher budgets of the German towns are due not merely to the incompleteness of the English accounts, but also to the larger number of persons relieved in Germany. I do not think this must be taken to mean that there is more destitution in the German towns. In my opinion it means that the Elberfeld system of outdoor relief is more thorough or more humane than our own, and that more help is given to the needy by it, which is one of the reasons why there is so little visible destitution in the German towns. It really combines charity with public relief, and recognizes

the claims not merely of the destitute, as the English poor law does, but of the poor and needy generally.

Perhaps I should add a warning against taking the figures I have given as a general measure of the poverty prevalent in either country, and particularly in England. The towns mentioned are manufacturing towns, and these are not the seat of much poverty. The idea that they are is very common, but it is a mistake. The homes of poverty are the seaports and trading centers. For instance, the cost of pauperism was 5s. 1d. [\$1.22] per head in Hull, 6s. 9d. [\$1.62] in Manchester, and 7s. 5½d. [\$1.78] in Liverpool, or more than three times that of the purely manufacturing towns. The standard of comfort in the latter is very high, and calculations of poverty based on experiences in London and elsewhere are totally inapplicable to them.

With regard to causes of poverty, an analysis of the cases at Elberfield gives the following result: Sickness, 20 per cent; want of work, 19 per cent; insufficient earnings, 18 per cent; old age and incapacity, 16 per cent; widows, wives of men on military service, divorced wives, unmarried mothers, 7 per cent; deserted women with young children, 7 per cent; orphans, 3 per cent; husband in jail, 2 per cent.

13. TRADE UNIONS.

LAWS RELATING TO TRADE UNIONS.

The law relating to trade unions is not in such a state of confusion in Germany as it is in England, though it leaves the limits of trade-union action uncertain in many respects. Its superior clearness is largely due to the fact that some things the legality of which is doubtful in England are expressly forbidden in Germany. In other words, the activity of trade unions is more restricted by law, and this is one of the chief reasons why the influence of such organizations is turned more into political channels. The point is of importance, because political action, though it has the same end in view and may eventually realize it more fully, moves more slowly and with less embarrassment to industrial enterprise than the direct attack. The pent-up energy of organized labor finds vent at the polls, not in the workshop. It may be argued that pent-up energy is more menacing to social order than that which has a free vent. Probably it is if it has no outlet at all; but there is a mean, and the German legislature has endeavored to hit it. The great difficulty in all these things is to hit the right mean, and nothing excites more admiration in the student of social legislation than the capacity of the Germans for aiming steadily at it, not without an occasional bad shot, of course. One fact, I think, goes to show that they are not far wrong in regard to organized labor, and it is this, that even where trade unions have the freest scope for their activity and pursue their ends most successfully—namely, in England and America—labor, nevertheless, looks more and more to politics for assistance in addition. That seems to be a general and inevitable movement. The Germans are only somewhat ahead, and meantime they avoid a good deal of the trouble which has handicapped their rivals, and particularly England. Their favorable position is due to other things besides the law, but it is assisted by the law.

The charter of trade organization is section 152 of the industrial code, by which the right of combination "for the purpose of obtaining more favorable wage and work conditions" is secured to all employers and employed, except servants, agricultural laborers, and seamen. The paragraph expressly mentions the cessation of work and dismissal of workers—otherwise strikes and lockouts—as lawful means to the authorized end. This seems clear enough, and no doubt it effectually legalizes the position of ordinary trade combinations and their proceedings. But there are some points to be noted. It has been laid down by the high court that the section only contemplates combination for the improvement of individual conditions. If the unions go beyond the economic interests of their members and aim at exercising an influence on public affairs or the discussion of political subjects, they come under the law regulating clubs. The section further does

not legalize any proceedings which are otherwise forbidden. If the means adopted to obtain more favorable conditions are actionable under the ordinary law, then the action lies against the combination, and the persons acting for it. In fact, the union and those who represent it are responsible for acts committed on its behalf. Orders or incitements to breach of contract, for instance, would render union officials liable to action.

This appears to settle those questions of liability which have recently led to so much confusion and uncertainty in the English courts. Equally clear is the German law with regard to pressure brought to bear on individuals to join in concerted action. Physical compulsion, intimidation, abuse, or denunciation for the purpose of inducing others to join or of preventing them from leaving such combinations is punishable by three months' imprisonment, if it does not entail a severer penalty under the criminal law. Denunciation—we have no exact equivalent of the German word—is any expression which is intended to bring a person into ill repute as unworthy of intercourse. It would include such terms as “scab” and “blackleg.” Threats of any kind come under this provision so long as they are intended to limit the free action of the individual. Simple picketing, however, appears to be in a doubtful position. The question came before the high court in 1900 in regard to some regulations issued by the senate of Lübeck which prohibited picketing. The court held that the regulations violated the right of combination guaranteed by section 152 of the industrial code and were therefore invalid, but left the question open whether picketing could be dealt with by the police on other grounds. By an order in council dated January 18, 1898, it was pronounced punishable as “grober Unfug,” disorderly conduct. With this brief explanation of the law, we can turn to the organizations.

THE “SOCIAL DEMOCRATIC” TRADE UNIONS.

There are three different classes of trade unions in Germany: (1) The “free” or Social Democratic Gewerkschaften; (2) the “German” or Hirsch-Duncker Gewerkvereine; (3) the “Christian” Gewerkschaften. The Social Democratic organizations are by far the largest, and therefore we will take them first.

The oldest, best organized, and strongest union is that of the printers and type founders. It stands on a somewhat different footing from the rest. Printers are a very intelligent and superior class of workmen, and they are particularly so in Germany, where the compositors' craft is brought to a degree of perfection which can hardly be matched by any other trade. They appear to have had some sort of organization among themselves, as might be expected of exceptionally skilled and educated men, from a remote period, and to have conducted their affairs apart from the political movement with which the later unions have been more or less associated. In short, their aims and methods more nearly resemble those of the English trade unions. In 1848 they formed a national union, or, as we might say, an amalgamated society, but it did not last long. In 1867 the present national union was formed. The membership was returned in 1891 at about 31,000. It is nominally affiliated to the federation of Gewerkschaften, but it stands outside the political movement and is able to protect the interests of the trade without assistance. Thus it has established a machinery for settling

disputes and wages by agreement with employers after the English model. The only other organization which has brought self-help to the same point, so far as I can learn, is that of the cutlery trades at Solingen.

The beginnings of the "free" *Gewerkschaften* date from about 1865. They originally represented a spontaneous labor movement and were regarded with indifference or hostility by the social democrats, who followed the teaching of Marx or Lassalle and saw no hope for labor save in the realization of a political and economic revolution. In their eyes "self-help" was a delusion, and in so far as it might succeed, or apparently succeed, could be only an obstacle to their programme; but the interest taken by workingmen in the movement suggested that it might be utilized as a means of political agitation, and in 1868 some members of the Lassalle party busied themselves in founding unions, which for the most part had a very brief existence. The followers of Marx, notably Liebknecht and Bebel, had somewhat more success in the same direction, until the antisocialistic law of 1878 swept over the movement like a hurricane. The strength of the unions during this period is not exactly known, but an investigation in 1877 showed that there were then about 30 organizations with branches in 1,266 places and some 50,000 members in all. The numbers had been considerably higher some years before, but the Marx party became rather alarmed lest the movement might be too successful in reconciling the work people with the existing order of things, and consequently discouraged it. The antisocialist law dispersed most of the unions for the time being, but the impulse to combine was not to be denied, and organizations quietly re-formed under a different name.

They were, indeed, rather stimulated by repression, and before the law was repealed in 1890 they had reached a far higher membership than before or for several years later. This goes very strongly to show that trade-union organization is not the creation of socialism, even in Germany, but of the impelling force of common needs and interests among the work people themselves. Failure to perceive this fact leads to a misconception of the labor situation. After 1895 the unions began to increase rapidly, and were particularly stimulated by an agitation against the proposed repressive measure known as the *Zuchthaus-gesetz* in 1899. At the last congress at Erfurt in 1902 the number of affiliated organizations was returned as 62, with 678,181 members. The largest unions were, metal workers, 102,905; masons, 80,869; wood workers, 70,251; miners, 38,042; factory and general laborers, 31,857; textile trades, 28,836; carpenters, 24,151; shoemakers, 19,585. Their aggregate income in 1898, when they numbered about 500,000 members, was £275,433 [\$1,338,498].

These trade unions are commonly called Social Democratic, but their relation to the Social Democratic political party is vague and undefined. They are nominally nonpolitical, or at least they have no avowed connection with a political party, and it must not be assumed that they are thick-and-thin supporters of the social democratic programme. The truth seems to be that the two seek to use each other and exercise a mutual influence. The *Gewerkschaften* form a large organization, admirably adapted to further a political campaign, and the party in turn is a parliamentary force which can do a good deal to promote the aims of the unions; but it is to be noted that as the party increases its strength by canvassing the labor vote through the unions, it slowly and

reluctantly but steadily and inevitably modifies its programme and its tactics. The working classes want to "better themselves" by getting an easier life and a larger share of what is going; they do not want a class war or a revolution, though of course there are individuals among them who believe in the whole socialist theory. The fact that the masses do not is further shown by the development of the antisocialist unions, which will be presently described. If this is taken into account, together with the significant modification of the socialist party's attitude as its success increases at the polls, it is, I venture to think, clear in which direction things are tending. There are many things that labor wants far short of the "nationalization of all the means of production," and it is going to get them or some of them by degrees. With the two most powerful parties in the Reichstag bidding for the votes of workingmen the issue is certain. Moreover, as they get them the "nationalization, etc.," and the class war will quietly drop out of sight. Social Democracy will not be the first movement which has died of apparent success.

THE "GERMAN" TRADE UNIONS.

These unions were founded in 1868-69 by the efforts of Doctor Hirsch, formerly a progressive member of the Reichstag. They made rapid progress at first, but came to grief over an unsuccessful strike of miners. After the war they began to recover, and steadily, though slowly, increased. In 1901 they counted over 1,800 local unions and 16 national unions, held together by a central federation. The present membership is believed to be about 100,000. The strongest sections are the engineers and metal workers, "factory and hand workers," cabinetmakers and shoemakers. They are avowedly founded on the English model and seek to improve the condition of their members in a practical way by promoting labor legislation and by benefit institutions. The first is the task of the central federation, the second that of the local unions. With regard to legislation they do not attach themselves to any party or programme, though in mutual sympathy with the free-thinking sections; but they watch the course of politics, press for measures in the interest of labor, and oppose those which threaten it. Thus they energetically fought the proposed Zuchthaus law, and in doing so found themselves marching with the "free" Gewerkschaften; but there is a strong antagonism between them and the social democrats, who have been excluded from their ranks since 1876. Every member before admission has to sign a declaration that he is neither a member nor a supporter of the party.

They expressly repudiate the class war and the visionary aims of the Social Democracy; they take what they can get from the legislature, aim at peaceful relations between labor and capital, while maintaining their own interests, and for the rest rely upon self-help. To this end they pay much attention to benefit funds and particularly to out-of-work support, which is the weakest point of the other unions. The expenditure on this head in the year 1899 was £5,290 [\$25,624], and in the nine years 1892-1900, £43,306 [\$210,744]. Members receive from 6s. to 7s. 6d. [\$1.44 to \$1.80] a week for thirteen weeks. The Hirsch-Duncker unions particularly pride themselves on their sound financial position. In 1900 their accumulated reserve, apart from sick and burial funds, was £55,000 [\$267,657]. Their total funds were £153,542

[\$747,212], and their income £31,453 [\$153,066]. The other trade unions, or rather the Social Democratic writers and speakers, often sneer at this line of action, but it is more practical than their own and more in accord with the example of the English unions, whose strength and influence they acknowledge and envy.

THE "CHRISTIAN" UNIONS.

These organizations are of much more recent date than the other two classes. Their name needs some explanation. They are called "Christian" to distinguish them from the Social Democratic unions. The word is intended to signify "anti-Social-Democratic." It is not that they are religious organizations; on the contrary, their aims are purely economic and social. It is rather that the Social Democrats are anti-religious and the "Christian" unions stand for a protest against that spirit, which has infected the "free" *Gewerkschaften* along with the Social Democratic politics. The point is of great interest, and as it appears to be very little understood in England, I will enter into it a little more fully.

The Social Democratic teaching is essentially antireligious. The spread of atheism used to be set forth openly as one of the cardinal points in the programme. "We are simply done with God" (Engels); "We open war upon God because he is the greatest evil in the world" (Schall); "It is our duty as socialists to root out the faith in God with all our zeal, nor is anyone worthy of the name who does not consecrate himself to the spread of atheism" (Liebknecht). These utterances by former leaders of the party indicate the spirit.

Now, Berlin is the headquarters of Social Democracy, and such sentiments have found a good deal of support there; but, as I have already pointed out, Berlin does not represent Germany. It is a great mistake to regard the German people as particularly skeptical. Some classes are, no doubt, but the people are God-fearing, and even among the highly educated there is less confidence than there was in the sufficiency of science and reason to settle everything. That attitude is antiquated. On various grounds the crude assaults of the Social Democrats upon religion were generally resented, and it is only since such violent utterances as those quoted above have been dropped that the political movement has made rapid way. This is one of the modifications referred to above. It was found politic to adopt a milder tone and to profess indifference about religion, though anti-Christian pamphlets are still issued and sold. The present attitude found amusing expression in the Reichstag last session, when the deputy Albrecht, who is a master tailor at Halle, laid down the views of the party in the following terms:

We regard religion as a private matter, we deprive no one of his religious convictions; but we tell the workmen to acquire as much knowledge as possible, for the more they know the less they need to believe. Eventually, when they know everything, they need believe nothing.

These remarks, apparently delivered in good faith, naturally caused great amusement. It would be unfair to saddle the whole party, which contains some highly educated men and embraces fundamental differences of opinion, with the follies of an ignorant member; but his words sufficiently represent the attitude of orthodox Social Democracy

toward religion; violent hostility has been modified to contemptuous tolerance, and the cogent reason for the change is that hostility did not pay. The Christian unions are standing witnesses to the fact.

The revolt against the antireligious spirit within the "free" *Gewerkschaften* and the foundation of separate unions originated with the miners of the Rhine-Westphalian coal fields in the year 1894. They had already for some years had experience in organization of a different kind in the "Christian social" societies (*Vereine*), started in 1869, and attempts were made from time to time to found a trade union, but without lasting success, until the appearance of a Social Democratic federation of miners and iron workers stimulated an energetic attempt to establish rival organizations and dispersed the fears of the Christian social leaders, who found themselves compelled in self-defense to accept and assist the strong bent of the workmen toward combination on the lines of the English trade unions.

The movement started by the miners was taken up by other trades and spread to various parts of Germany. In 1902 the total membership was returned at 175,079, distributed in 35 chief organizations, of which 26, with 84,667 members, were affiliated to the central association. The railway men are particularly strong in these unions, having 67,674 members in Prussia, Bavaria, Baden, and Württemberg. Of the other trades the original miners' union still remains the strongest, with 35,000 members in 1901 (40,208, February, 1903), and the central union of Christian textile workers comes next, with 15,000 in 1901. The total income for that year was £22,733 [\$110,630] and the expenditure £12,727 [\$61,940], of which £3,756 [\$18,278] was for strike pay. The headquarters and the general secretary's office are at München-Gladbach.

The practical objects of the Christian unions are (1) to secure the efficient administration of the existing social laws; (2) to promote their extension and completion; (3) to improve the condition of the working classes by cooperative self-help. In pursuing these ends they rely upon the principle of combination independently of political parties, but their antagonism to the Social Democrats creates a certain bond between them and the central party, and they are not altogether free from entanglement in the political net. Their only quarrel with the Hirsch-Duncker unions, with which they are otherwise in cordial sympathy, is that the latter are too supine in pushing the cause of labor and confine themselves too much to pecuniary benefits. Religious matters form no part of their proceedings, and Catholics and Evangelicals are equally welcome; but they take their stand generally on the Christian religion as a moral and social basis, and are absolutely opposed to Social Democracy.

What they look forward to is eventual union with the "free" *Gewerkschaften*, when the latter have purged themselves from this taint, but at present such a consummation is not in sight. Probably the recent elections, with the sweeping success of the Social Democrats, have put it further out of sight than ever for the time being; but it remains to be seen what the party will do for its friends. If it does nothing—and hitherto it has done rather less—a reaction is not unlikely. The trend in all countries is to the formation of a labor party, and the German workmen, who are strongly resolved to have a larger share in the growing prosperity of the country, may see their advantage in cutting loose from a sterile dogma and returning their own independent can-

didates. It is surprising that they have so long put up with the lawyers, writers, and employers who form the bulk of the Social Democratic party in the Reichstag. If they do so, or if, on the other hand, the Social Democrats definitely drop their antiquated dogmas and concentrate on practical reforms, there is no reason why all the trade unions should not work together for common ends. Their present distraction is a great source of weakness.

TOTAL MEMBERSHIP AND ADMINISTRATION.

Putting the three classes of unions together, we get a total of nearly a million members. Of these a very small proportion (19,000 in 1899) are women, who do not take more kindly to organization in Germany than anywhere else. Individual unions are affected by the usual fluctuations, and their membership rises and falls erratically. For instance, nine of the "free" Gewerkschaften lost 12,254 members in 1900, and the net loss of the whole federation was nearly 3,000; similarly the "Christian" miners lost 3,000 members in 1902. On the whole, however, the organization of labor is steadily and even rapidly progressing.

The administration of the unions follows English lines. Contributions are weekly or monthly, and vary considerably, but they are generally less than in England. Considering the amount of compulsory thrift and insurance, it is rather surprising that the men have anything left for the trade unions. The usual rate of contribution is from 10pf. to 30pf. [about $2\frac{1}{2}$ to 7 cents] a week, but in the Hirsch-Duncker unions it rises to 58pf. or 7d. [14 cents]. No comprehensive information about expenditure is available, but except in the Hirsch-Duncker unions a large proportion of the funds appear to be spent on strike pay. The accounts of the Berlin Trades Council, a very powerful body embracing something like 100,000 members, show a total expenditure in 1891 of £5,037 [\$24,503], of which nearly £4,000 [\$19,466] was for strike pay. This, of course, does not include the accounts of the separate unions. Of the benefits provided by trade unions the most general is burial money, and after that sick pay. I believe they all have burial funds and the most of the well-established societies have sick funds also. The out-of-work pay of the Hirsch-Duncker unions has been already mentioned; the "Christian" unions do not appear to have established this form of benefit as yet. Of the other Gewerkschaften the printers have had a regular system of unemployed pay since 1879; the amount varies with the length of membership; the maximum is 1s. 6d. [36 cents] a day for 40 weeks. In the great strike of printers in 1891 over 10,000 assistants were thrown out of work, and the union spent more than £100,000 [\$486,650]. The average annual expenditure on the unemployed from 1880 to 1900 was £4,616 [\$22,464]. From time to time other unions have followed their example; the glove makers in 1885, the hat makers in 1886, the copper-smiths in 1887, and others later. At present 16 Gewerkschaften, in addition to the printers, have out-of-work funds.

Amalgamation of local unions into central societies is the rule; the local bodies are represented in the amalgamated societies by elected delegates. The affairs are managed by committees with paid secretaries. General congresses are held every two or three years. The trade newspapers are numerous, especially among the "free" Gewerkschaften, and form an important factor in maintaining and promoting

organization. Those of the "free" Gewerkschaften are reproached with being given up to furthering the politics of the Social Democratic party. Trade councils, or local combinations of different trades, are much less common than in England. That of Berlin has been mentioned; it has a handsome and spacious set of offices.

LABOR DISPUTES.

It is often assumed that the organization of labor necessarily promotes conflicts with capital, but that is a mistake. The effect of organization is to increase the fighting power of labor. That is, indeed, its object, but not necessarily to increase fighting; it may diminish it. In England, where a good many trade unions were infected by a wave of socialism borrowed from Germany, but applied in a crude and foolish fashion (English socialism is the subject of ridicule in Germany) disputes were greatly promoted, but at the present time the unions are a distinctly moderating influence. Some prominent trade unionists spend the greater part of their time in composing disputes, and, to speak generally, there is least conflict where both sides are best organized. Although occasions of conflict may be numerous, they are prevented from coming to a head by the mutual organization. In Germany, as in America, that point has not been reached. In both countries employers dislike and dread the unions with an intensity which has no parallel to-day in England. And they have reason. No one can read the signs of the times without perceiving that they have great trouble before them, particularly in America, where labor and capital are beginning to enter upon a conflict to which all previous experience will be a trifle. In Germany the prospect is less alarming. The law prohibiting intimidation, explained above, removes one prolific source of trouble, and the absence of attempted interference with the management of the business, which I have never heard alleged against the unions, disposes of another. The energy which might be expended in these directions is turned to politics—a great immediate advantage to the employer. Nevertheless, disputes leading to stoppage of work are very numerous, and the growing strength of organized labor, if it does not increase them, is likely to make them more severe and more successful. Trade, after a long depression, has begun to revive, and as it improves workmen may be confidently expected to demand a larger share of the benefits.

The following table gives a summary of strikes in the last three years. It is interesting to note that the Germans have no word of their own for this proceeding, but have adopted the English word with German spelling—*Streik*. I should add that the official statistics are said to be inaccurate and untrustworthy by representatives of labor.

Statistics of strikes and lockouts in Germany, 1900 to 1902.

	1900.	1901.	1902.
STRIKES.			
Number of strikes.....	1,462	1,071	1,084
Establishments affected.....	7,740	4,561	3,437
Persons employed in them.....	298,819	141,220	131,086
Highest number affected at the same time.....	131,810	62,682	60,184
Subject of dispute:			
(a) Wages.....	1,436	868	796
(b) Hours.....	513	249	222
(c) Other matters.....	820	586	564
Result:			
(a) Complete success.....	275	200	228
(b) Partial success.....	505	285	235
(c) Failure.....	653	571	597
LOCKOUTS.			
Number of lockouts.....	38	38	51
Establishments affected.....	607	238	948
Number of persons locked out.....	9,085	5,414	10,305
Subject of dispute:			
(a) Wages.....	8	10	21
(b) Hours.....	6	9	9
(c) Other matters.....	10	27	36
Result:			
(a) Complete success.....	13	16	30
(b) Partial success.....	17	8	7
(c) Failure.....	5	11	9

It will be seen that the number of disputes is very large, but the number of persons affected relatively small. Strikes are evidently not on a large scale, but the tendency to carry disputes to a stoppage of work is strong. When labor is better organized the scale of warfare is likely to be enlarged. There are signs at present of haste and weakness. The proportion of complete failures is very high, but probably the men would deny the accuracy of these figures. With regard to the subjects of dispute, in a good many cases various grievances are evidently combined, but wages markedly preponderate. The "other" (unnamed) subjects of dispute are manner of paying wages, reengagement of dismissed hands, dismissal of workmen and foremen, leave for Labor Day, May 1, sanitary improvements, "strike work," personal treatment, nonrecognition of workmen's committee, hanging up of factory rules, and introduction of wage scale. In some of these disputes we see the hand of the trade union, but they are trifling in numerical importance compared with disputes over wages and hours. The building trades account for far more strikes than any other. This seems to be the case in every country. There is something about these occupations, and particularly bricklaying, which promotes strikes. Probably it is that the tie between the men and their work is very loose; they can easily go off and get another job elsewhere. Then the work gives great opportunities for talking over grievances and the exposure conduces to drinking. The 1,084 strikes in 1902 were thus apportioned: Building trades, 470; wood-working trades, 139; textile trades, 106; metal-working trades, 73; stone and earth trades (quarries, pottery, and glass), 71; clothing trades, 61; engineers, etc., 48; food and drink trades, 38; leather trades, 20; other trades, 58. The bricklayers, carpenters, and joiners were responsible for 36 per cent of the whole.

The failure of arbitration to prevent disputes from developing into stoppages is strongly illustrated by the frequency with which this

occurs in Germany, for an extensive system of arbitration exists in the form of special industrial courts for the settlement of disputes. These courts are composed of a neutral president and an equal number of employers and employed as assessors. Since the beginning of 1902 the law has provided that such courts should be established in every place with over 20,000 inhabitants, but no information about the result is available. In 1900, however, there were 316 such courts, and they dealt with 84,164 cases, of which 75,761 were complaints brought by employed against employers, 8,068 by employers against employed, and 335 by employed against each other. The claims are for the most part for very small sums of money, one-half being for less than 20s. and only 5.3 per cent for more than £5 [\$24.33]. Of the claims, 28 per cent were withdrawn and 44.2 per cent compromised; only 1.3 per cent were allowed. There is no limit to the amount of the claim which may be brought before the court. The labor organs demand an extension of the system in the direction of more compulsion. In addition to these courts, the guilds have arbitration courts (393 in 1900).

14. GENERAL EDUCATION.

GENERAL FEATURES OF GERMAN EDUCATION.

The distinctive qualities of a nation are revealed in nothing more clearly than in its educational institutions. Germany is proud of hers, and the world admits her right to be proud of them. They are regarded with universal respect, and nowhere, perhaps, more than in England. Yet, if one may judge from public utterances, many of those who extol German education have a very vague, if not entirely erroneous, notion of what constitutes its excellence. Otherwise we should hardly have the curious suggestions which are constantly made for improving our own education or the exhortations to copy the American example, for in this, as in other things, the United States and Germany are at opposite poles. To sprinkle "technical" schools, colleges, and universities about the country, as from a pepper box, with the aid of millionaires, to modernize the old public schools and universities by substituting science or commerce for classical studies, to secularize elementary schools, and to place within the reach of everybody the same general education up to 18 or 21—these are, roughly, the suggestions most frequently made. There seems to be a general assumption that the more educational establishments we have, the more "technical" they are, and the longer young people are kept in them, the better. Those are the principles which have directed educational "progress" in this country and in the United States, but they are not the principles taught by the example of Germany. In this as in other matters discussed in these articles the distinctive excellence of German procedure lies in the conscious adaptation of means to a definite end. That is why the Germans are so methodical. They do not act at random, because they keep the end in view. They rarely mistake the means for the end or become the slaves of words. The reason is, I suppose, that they think things out more thoroughly than other nations. It has its drawbacks; it makes them slow and deliberate, but it makes them sure, and it is the lesson above all others that we need to learn from them, because our weakness lies in the opposite direction. When we clearly see the end we pursue it as directly as any other people and with unequalled resolution; but we are generally vague and uncertain, we mistake the means for the end, and are perpetually enslaved by phrases. The example of the United States is the worst for us to follow, because there they are also vague, though not so vague, rather more phrase-ridden, and wildly adventurous into the bargain.

Now, education in Germany is regarded and treated as the means to an end. The end is the production of good citizens and the promotion of national strength and efficiency. I suppose that would be generally allowed to be the end here, but the difference is that in Germany it is kept in view, and here it is not. All kinds of things are substituted. First, education is made an end in itself, then schooling is confounded with education, and its multiplication and prolongation become ends;

then some "system" or "method" is exalted into a fetish; the word "science" or "technical" dominates some minds; in others religious animosities or party politics or social ambition or class feeling are the actual motives. Amid all these things the real end drops out of sight. An illustration may be taken from the most justifiable of these aberrations, the cry for technical education. It takes the form of demanding institutions like those of Germany or some other country and multiplying them in a promiscuous fashion. The end is never clearly formulated, but technical schools become an end in themselves. If we really took Germany for an example we should first ask ourselves, Whom are we going to educate, and why? And we should adapt the means accordingly. We have a large number of technical schools, but if you inquire of those interested in them what they are aiming at you find at once the most vague, confused, and contradictory ideas prevailing. Some think their object is to produce better workmen, others that it is to produce anything but workmen. To reconcile the various objects intended to be served by the same institutions, you must have recourse to the most general formula and say that their purpose is to teach something useful to anybody who cares to learn. I dwell on this confusion, not in condemnation of our schools, which have many good points, but in order to make clear by contrast the distinctive qualities of German education. It is not so much the institutions that we should take for our example, as the spirit and purpose which have fashioned them. From top to bottom they have been developed out of the past by a logical process to meet clearly defined needs arising out of the march of events. They have thus become differentiated into many grades, each adapted to a specific purpose. To give even the briefest account of them all would occupy a great deal of space and would be quite beyond the scope of these articles. It will be sufficient to take the chief points bearing on industrial efficiency.

ELEMENTARY SCHOOLS.

Elementary education is compulsory throughout Germany from 6 years up to an indeterminate age, which is in practice usually 14. Individual school liability may cease before that age, at the discretion of the district or local inspector, if the child has reached the standard deemed sufficient. All children are required to have this schooling, and if they do not receive it elsewhere to the satisfaction of the State they must go to the public elementary schools. About 95 per cent of the children of school age are taught in these schools; that is to say, the great mass of the people receive their elementary education there. It is free in some parts of Germany, but not in all. Of the two States with which we are chiefly concerned, Prussia has free elementary education, Saxony has not; there the parents pay a small fee—usually 5s. or 6s. [\$1.34 to \$1.46] a year—but if they are totally unable to pay it may be remitted. In both States, and I believe throughout Germany, they have to provide the books and other things required.

The function of the *Volkschule*, or people's elementary school, is "the religious, moral, and patriotic training of the young by education and teaching and their instruction in the general knowledge and acquirements requisite for civil life." This definition gives the key to the whole educational scheme. Character and conduct are the primary objects, then love of country, then such general knowledge as will

enable the child to take its part in the ordered life of the community, whether as man or woman; and, after that, the special knowledge. Religion, therefore, comes first, as the indispensable foundation of morality and conduct. The logical German mind holds that morality can not be efficiently taught apart from religion, and, further, that religious teaching to be effective must be dogmatic. For this the law carefully provides. The schools are denominational and separate for Roman Catholics and Evangelicals, except where there are not enough children of one confession to form a separate school; in that case they are mixed—*paritätische* or *simultanschulen*—but the children receive religious instruction from teachers of their own confession. In 1896 there were in Prussia 680 such schools, principally in Posen and West Prussia. In a few towns all the schools are mixed. In many towns there are also separate Jewish schools, and occasionally one or two of some other sect. In all cases they are on a footing of equality before the State and the law, which ordains religious teaching, but leaves the choice free. The instruction is divided into (1) Biblical history, (2) catechism; the latter, of course, is dogmatic. Each has so many hours a week given to it; as a rule, three to Biblical history and two to catechism. In evangelical schools both are taught by the teachers; in Catholic schools Biblical history is taught by the teachers and catechism by the clergy. I dwell on these details, partly because they are not known in England and partly because of their significance in the educational scheme, which can, I think, hardly be overrated. Just as the Germans have known how to retain the classical element in their higher education while adding the highest developments of science and other modern studies, so have they known how to build up the most complete system of national education upon the old foundations of character and conduct. They have not flung away the old in acquiring the new, but have combined them. The retention of systematic religious teaching has a far-reaching influence on the national life, which is plainly visible in many directions, and not least in the industrial sphere. To it may be traced the sense of duty and responsibility, the respect for law, the steady effort, the self-restraint, the maintenance of a higher ideal than the materialism of social democracy, which have been noted in previous articles. And to these may be added the striking absence of corruption in public life, which is the indispensable condition for the healthy exercise of those municipal functions that are carried on upon so large a scale in German towns to the benefit of the community.

The other subjects of instruction are the German language, arithmetic, with elements of geometry, drawing, history, geography, natural history, and singing; also gymnastics and drill for boys and domestic hand work for girls. Great attention is paid to the language. The children are taught to speak, read, and write correctly, and particular pains are devoted to secure clear enunciation and good pronunciation. Thoroughness is the great aim—quality, not quantity, of accomplishment. The standard of handwriting attained is remarkable. Altogether the scheme of instruction carefully avoids the ambitious and fanciful; it aims at the thorough mastery of elements rather than a smattering of extras, and as there is no competition for grants the children need not be crammed.

The school year begins at Easter, and varies from forty to forty-six weeks. The holidays, which occur at midsummer, Michaelmas, Christ-

mas, Easter, and Whitsuntide, take up eight weeks in the country and nine in the larger towns. They are somewhat longer in southern than in northern Germany. The school week ranges from twenty hours in the lowest classes to thirty-two in the highest. Attendance is remarkably regular and punctual. In the upper classes boys and girls are separated as far as possible. Coeducation does not find favor in Germany. Corporal punishment is allowed, but teachers are directed to administer it as sparingly as possible. The law runs as follows:

Only after repeated and unsuccessful application of one of the former punishments (reprimand, standing out, detention after school, etc.), or on account of flagrant disobedience or gross misconduct, is a moderate corporal chastisement permitted, but always in a measured form and so as not to be injurious to health. The corporal punishment of girls is to be avoided to the utmost.

The school buildings are regulated by law with respect to height of rooms, cubic space, and other matters. Great attention is paid to ventilation, warming, and light, and in these respects the newer schools, in towns, at least, are excellent. I have previously noted the value attached to good lighting in factories; it is the same in the schools. The Germans appear to me to have realized more than most people the very simple facts that a bad light spoils the eyesight by straining accommodation, and that a good one greatly increases efficiency by diminishing the expenditure of nerve energy on mere perception and consequently releasing it for other work. So far as one can make a general statement from a limited field of observation I should say the school buildings are plain and unpretending, but adequate and well adapted to their purpose.

The most important factor, however, is the teaching staff, and this is, I think, the strongest point in the German system. The teachers are trained in seminaries, of which there were in Prussia 129—120 for men and 9 for women—in 1901. The course there lasts three years and is carried out in three classes, but the training really extends over six years, as the seminary is preceded by three years in preparatory institutes, which are maintained either by the State or by municipalities. In Saxony the whole six years are passed in State training colleges. Qualification for appointment is obtained by examination at the close. In addition to the systematic preparation for the career thus secured, the efficiency of the teachers is promoted by their recognized position. They have the duties and rights of civil servants, and as such enjoy various privileges, including partial exemption from liability to military service and from municipal taxes, as well as an assured and sufficient income and a pension. The official position has, further, a moral value in Germany which it lacks with us. It carries with it a dignity and respect which in an educated man generate self-respect and self-confidence, the opposite of self-assertion. The German elementary school teacher has no need of self-assertion and consequently does not teach it—that bane of our elementary schools. He is somebody, has a definite social standing, though it may be humble, and takes a pride in his work. These moral factors count for more than syllabuses or examinations. The impression gained from observing class work in operation—it can not be more than an impression—is that the teachers are extremely well qualified for their work and take great pains with it. I am pretty certain that German children are of slow rather than quick intelligence; time and patience are required to ground them thoroughly, and these are given. The proportion of ex-cerpts

unable to read and write is constantly diminishing. In 1900 it was only 1 per cent in Prussia. A weak point is the size of the classes. The limit for single-class schools is 80, but this is sometimes exceeded. For other schools it is 70, or in some places 60. On the other hand, each class has a room to itself. In the towns the schools have mostly six or seven classes, and the average number of children in a class is about 40 or 50. I have not observed a large proportion of spectacled children. The proportion of female teachers is very small on the whole, but it varies greatly in different places. For instance, Düsseldorf had (1901) 257 men and 227 women, Chemnitz 523 men and 15 women teachers.

The cost of elementary schools is borne chiefly by the local community out of the taxes, with subsidies from the State. This entitles the community to a share in the administration, which is, however, mainly in the hands of the Government. The organization varies in different parts of the country and is somewhat complicated. It will suffice to say that the most important factor is the district inspector, who is a Government official. He wields authority over the internal management of the school, the teaching, discipline, etc. In Prussia he is under the school department or council of the provincial government; in Saxony, immediately under the ministry of education. The buildings and external matters fall within the jurisdiction of another Government official. Under the district inspector is a local inspector to each school. He is generally the parish clergyman, particularly in evangelical districts, and acts as chairman of the school committee, which represents the local community. In towns the latter is generally the municipality, but the school community is not necessarily identical with the municipal. The actual share taken in the administration by the local authority, representing the ratepayers, varies considerably and can hardly be defined. In practice it amounts to a good deal, at least in towns.

It must be understood that in dealing with this very large subject I have only touched on the main features of elementary education as bearing upon industrial life. For further details the reader is referred to the excellent essays published by our education department, and particularly those in volume 9 of the special reports. I have read these essays since making a study on the spot, and have been much fortified in a laborious inquiry to find both facts and impressions confirmed by observers of much greater experience in elementary education than my own.

A few statistics may conclude this branch of the subject:

Statistics of elementary public schools in the German Empire in 1901.

Schools (Volkschulen)	58,164
Male teachers	122,145
Female teachers	22,339
Scholars	8,829,812
Total cost	£20,644,300 [\$100,465,486]
State contributions	£6,017,800 [\$29,285,624]
Number of scholars to each teacher	61
Average cost for each scholar	£2 6s. [\$11.19]

CONTINUATION SCHOOLS.

At 14 the children leave the elementary school after eight years' schooling, divided into three grades, and begin to earn their living.

Some indeed do that earlier. I have already mentioned that in 1901 there were 9,454 children under 14 employed in "Fabriken"; and a very large number, sometimes at quite an early age, are further employed at home or in business other than work in Fabriken. A new law has just been passed regulating both these classes of employment. Broadly, however, the normal course is for boys and girls to go to school till 14 and then to work either at home, helping their parents, or in business. In trades where apprenticeship obtains boys are apprenticed; in others, boys and girls are taken on at a low wage—say, 2s. 6d. [61 cents] a week and work their way up as they grow and acquire the skill. They learn their trade in the place where it is carried on, which is the only place where it is or can be properly learned. But in order to prevent their forgetting all they have learned in school, which they readily do, and to promote their mental development in the same direction, continuation schools have been established, where they get a few hours' instruction in the week from 14 to 16, 17, or 18 years of age. There is no uniformity about these schools, which have been developed out of voluntary efforts; they are different in towns and on the land, different for boys and girls, and different again in different States, being compulsory in some and not in others. I confine myself to those bearing upon industrial life. In Saxony and some other States continuation schools are compulsory throughout the State for boys from 14 to 17; in Prussia they are optional; that is to say, local authorities have power to establish them and make them compulsory. The use of this power is gradually extending; at present the schools are most developed in Nassau. The boys attending them are mostly learning or exercising a trade, whether a handicraft or work in shops or factories. The object kept in view in the schools is twofold—(1) to continue their general mental development and (2) to help them to become efficient in their trade.

As Düsseldorf is one of the latest towns to establish such schools, it may be taken to illustrate their aims and character according to the most recent ideas. The by-law establishing the schools, authorized on December 10, 1901, provides that all apprentices and youthful workers engaged in every sort of trade, including commercial business, in the town are bound to attend the continuation classes on the days and hours appointed until the end of the school half-year in which they complete their sixteenth year. If they fail to reach the standard required the liability may be prolonged for another half or full year. Only those are exempted who can produce evidence to the satisfaction of the school committee that they possess the knowledge and acquirements which it is the aim of the school to impart. Youthful workers, apprentices, etc., who have passed the school age may be admitted as voluntary pupils on payment of the school fee, with the consent of the committee. Employers are bound to contribute 1s. 6d. [36 cents] quarterly for each scholar employed by them of school age; voluntary scholars pay the same. Scholars are bound to attend regularly and keep the rules under a penalty of 20s. [\$4.87] or three days' imprisonment. The latter has been applied in two or three cases. Parents and guardians are bound not to keep boys from coming, and employers are bound to let them leave off work in good time to attend school, both under the penalty named above.

There are, therefore, both compulsory and voluntary classes, and to these must be added drawing classes for boys, which are also voluntary.

The number of pupils on the register for the winter half of 1902 was, compulsory, 1,612; voluntary, 1,026; boys' drawing, 224; total, 2,862. The compulsory classes are the most important. In their arrangement the calling of the pupils is the guiding principle. The classes number 49, thus distributed: Preparatory for backward lads, 2; unskilled workers, 13; metal workers, 12; shop apprentices and clerks, 6; building trades, 4; art trades, 3; bakers, 2; graphic trades, 2; barbers, butchers, gardeners, saddlers, shoemakers, and plasterers, 1 each. The size of the classes varies from 18 to 45. They are held in the elementary schools. The hours are in all cases six a week, namely, from 5 to 8 p. m. twice a week, except for the barbers and bakers, whose hours are from 2 to 5 p. m. No compulsory classes are held on Saturday. The voluntary classes are held on Sunday morning from 9.30 to 12.30 or in the evening from 7 to 9 on one or two days in the week. The subjects of instruction are drawing, arithmetic, reading, composition, bookkeeping, knowledge of social legislation, and other matters bearing on the rights and duties of the lads as members of the community. For instance, they are instructed in the labor laws, the legal relations of employers and employed, workmen's insurance, the object of tariffs, taxation, and similar matters. Arithmetic and reading are carried beyond the Volksschule limit, and essays are set in such subjects as those mentioned. But the chief energy of the Fortbildungsschule is expended on drawing, which is taught in the most methodical manner and on a carefully devised system. The principle is, while training the hand and eye, to make the exercise bear specifically upon the trade in which the pupil is engaged, and great ingenuity is expended on adapting the lessons accordingly. The lads have to come clean, and particularly with clean hands, which has a good disciplinary effect. Doctor Kuypers, the Government district inspector, who has been placed in charge of the Düsseldorf Fortbildungsschule and is responsible for the organization, has studied the English voluntary continuation schools and formed a high opinion of them, especially those in London. He has utilized various suggestions picked up there in the organization of his own. In Germany, I may say generally, they are very well informed about English institutions and frankly appreciative of their merits.

The German continuation schools are for the most part administered and maintained by the municipality under Government supervision and with the aid of a grant. They also receive in many cases substantial support from employers, who have also founded and maintained such schools, where they did not otherwise exist, on their own initiative. Other employers, again, where there are none, insist that their apprentices shall attend neighboring schools. A special class of continuation schools called "work schools" is maintained in the State mining district of the Saar, and the miners of the Ruhr coal fields have a number of their own.

DOMESTIC SCHOOLS.

In the Volksschulen girls are taught sewing and other hand work up to the age of 14. Afterward those who stop at home and help their mothers have an opportunity of learning and practicing all kinds of housework; but in an industrial country, such as Germany has become, a great many begin to earn their living at once in factories and shops. They are apt to forget what little they have learned and to acquire no

further domestic accomplishments until they marry, and enter the school of experience unprepared. This defect is to some slight extent, but in no uniform manner, remedied by domestic schools, of which there were, in the year 1897, 163, with 9,689 scholars. Only 12 of them were established by municipal or other local authorities; the great majority are carried on by religious bodies or by employers of labor. A few are of ancient foundation, but, as a whole, these schools are the creation of the last few years, and may be regarded as a beginning. The subjects of study are cooking, sewing, knitting, ironing, and other household occupations. In these respects the education of girls belonging to the middle and upper classes is far better provided for than that of the lower classes, although the latter have more need of it.

TRADE SCHOOLS.

The education hitherto described is of a general character, with at most an indirect bearing on particular callings. If I am not mistaken there is a general impression in England that Germany possesses a very superior educational system for the training of workmen in their particular trades, to which the industrial progress of the country is largely due; but that is not so. They learn their trade in the work shop, just as our own workmen did in the days when they were more capable mechanics and artisans, if old hands are to be trusted, than they are now. Apprenticeship is still the technical school for workmen to-day in Germany; very few indeed, if foremen are excluded, attend the schools which are called technical in England. There are, however, some trade schools and workshops in which opportunity is given to lads of that class to study their calling more fully and to acquire greater proficiency than is possible in the regular course of ordinary work. Some of them are established by associations of employers, as in the metal industries of the Berg district, which have a school at Remscheid, or by individual firms. Guilds (*Innungen*) have the power to establish schools for their own trades, which are the handicrafts. They also assist in the classes of the *Fortbildungsschule* for their own specialty. No comprehensive information is to be obtained about trade schools of this class, but they are particularly numerous and well organized in Berlin. Practical and other instruction in the more artistic crafts is given at art-trade schools, such as that at Düsseldorf, which has been already mentioned in the account of that town. On the whole, it must be said that the technical schooling of ordinary workmen plays a very small part in the industrial development of Germany.

MILITARY SERVICE.

There remains one truly educational factor in the life of the workman, though it is not usually regarded in that light. At 20 all male German subjects, with some trifling exceptions, are liable to service with the colors for two years in the infantry or three years in the cavalry. It is reduced to one year in the case of elementary school-teachers and candidates for the post, and to one year's voluntary service for those who have reached a certain standard of higher education, or who pass the required examination. Practically, the male population passes through the ranks at the age of 20 to 22. The liability comes

just when a lad has learned his trade and undoubtedly forms a break in his civil career; but I have met with no two opinions about its educational value to the individual and its industrial value to the nation. Perhaps the most striking effect is the physical benefit derived from the exercises, drills, gymnastics, and regular life. It turns a weedy, anemic lad into a well-knit, upstanding young man with sound lungs and well-developed limbs. It further teaches him cleanliness, discipline, order, authority, self-respect, and respect for others. The effect in the workshop is visible at every turn. It is hardly too much to say that the military service is, more than any other educational influence, the making of industrial Germany. Employers and employed have gone through it together; they have learned in the same school, and they understand equally that order is essential to every organized force, industrial as well as military. It is sometimes objected that military training has the defect of making men automata and incapable of initiative. That is certainly possible. Nor can it be denied that the Germans, and particularly German workmen, are weak in initiative, but that appears to me to be in the national character, which is essentially deliberative rather than adventurous. Their virtue is order, and they do well to cultivate it. Perhaps, if the sole object of the training were social or industrial, it might be somewhat relaxed with advantage, but, as things stand, no unprejudiced observer can fail to see how great a source of physical and industrial strength it is.

15. TECHNICAL EDUCATION.

CLASSES OF SCHOOLS.

In England this term has come to mean almost any kind of study which is neither elementary nor classical; it includes cookery, needlework, foreign languages, bookkeeping, photography, biological science, art, and a host of miscellaneous subjects. On the whole, however, the idea of a craft predominates, and most of the English technical schools have for their principal object the teaching of actual industries. They supplement and fill out the manual practice of the workshop or the mill with wider knowledge, but the aim remains directly practical. In Germany, on the other hand, the term has come to be associated more and more with pure knowledge, and is now commonly reserved for those advanced academies which teach the science underlying industries, but not the industries themselves. I do not mean to imply that a hard and fast line is or can be drawn between the domains of knowledge and practice in this connection; but the predominance of one or the other produces a real distinction, which gives a distinctive meaning to the names used. Now, the different usage in regard to names in the two countries has led to confusion of ideas. Institutions differing in character and purpose are mixed up together through the ambiguity surrounding the word "technical." A more uniform and more precise nomenclature is desirable to prevent this; and though the English usage, in which the craft idea predominates, comes nearer to the original significance of the Greek word, the Germans are first in the field.

We are following them, and since we borrow their institutions we might as well accept their terms, as they have accepted our "strike." (A curious and instructive exchange, by the way; we give them strikes, they give us technical schools.) What we generally call technical schools are in Germany called *Fachschulen* or *Gewerbeschulen*—that is, "trade schools." The rendering is not exact; "*Fach*" is properly something shut off, a department, a particular branch of occupation; and the real distinction is that the *Fachschulen* give a special, not a general, education. We might call them specialty or occupation schools, but "trade schools" is more familiar and sufficiently exact. *Fachschule* is a general term which covers several kinds of institutions having different aims and catering for different classes. They fall into two main groups. The first group, which provides instruction for apprentices in the hand trades and artisans, has been mentioned in the previous article. I call these "lower trade schools." The second group is large and of great direct importance to the manufacturing industries. The "technical schools" in our large manufacturing towns correspond most nearly to these institutions, which may be called "higher trade schools." Then, above these is the highest class, namely, the "technical high schools," which do not correspond to any of our educational institutions.

Objection might possibly be taken to this grouping, as there are some schools which do not come very decidedly within any of the three classes, but stand, educationally, on the border line. That is a matter of course when institutions have been gradually developed to meet requirements as they arose, and it does not invalidate a broad classification. Some such classification is necessary if there is to be any clear conception of the function performed by this kind of education in Germany; and, after much consideration, the grouping suggested seems best for the purpose. It gives a clear view of the special educational provision for industrial life in three broad divisions: (1) Ordinary workmen; (2) those above the grade of workmen from foremen to manufacturers; (3) the high scientific experts, consultants, and innovators.

With regard to the first division, the lower trade schools, I have in the preceding article already said all that is necessary. They fulfill a useful function in the handicrafts, but have little bearing on the great industries.

HIGHER TRADE SCHOOLS.

The main differences between these and the corresponding English technical schools are two: (1) They are more specialized; (2) they are chiefly intended for and used by superior students. There is some provision for workmen, but, as a rule, comparatively little advantage is taken of it. The classes proper are held in the day, and can not be attended by men at work; those thronged evening lecture rooms and laboratories filled with young fellows out of the factories and workshops which may be seen in any large manufacturing town in England are almost unknown in Germany. If this statement is surprising to English readers it is because of that confusion to which I have referred. Whatever the intention of the two classes of institutions may be, their educational functions differ considerably in fact. The following comparative table, drawn up from particulars collected in 1900 by a committee for the corporation of Bolton, will illustrate the differences:

German and English technical or higher trade schools.

German.			English.		
Town.	Day students.	Evening students.	Town.	Day students.	Evening students.
Berlin, weaving.....	20	250	Bolton	40	2,500
Nuremberg, building.....	478	353	Birmingham.....	200	1,500
Chemnitz, weaving.....	60	None.	Leicester.....	18	1,000
Crefeld, textiles.....	200	None.	Derby.....	100	1,000
Mühlhausen, chemistry.....	75	None.	Salford.....	60	1,500
Reutlingen, spinning and weaving.....	150	None.	St. Helens.....	None.	1,000

The very large number of evening pupils in the English schools at once catches the eye; and I may say that the figures are quite representative. If other towns are taken—say, Sheffield, Leeds, Bradford, or Blackburn—the attendance shows a similar enormous preponderance in the evening classes. In some cases the figures are much higher than any given here. The German schools on the list have no evening classes at all with two exceptions, Berlin and Nuremberg, and of these only the Berlin school resembles the English ones in having more evening than day pupils. That is the first point to notice. The second is the very much larger aggregate of pupils in the English schools.

The two things go together; the total number is higher because of the evening classes. And the real meaning of this is that the English schools cater for students in a lower rank of life and teach a much larger number of subjects. Their lists generally include art, commercial subjects, "science" and "technology," as well as particular industries. Some of them, not included in the list—notably the London "polytechnics"—teach also such things as music and cookery. In fact, they only correspond with the German higher trade schools in so far as they do teach particular industries. In manufacturing towns the local industries are the chief subjects taught; in Leeds, for instance, engineering; in Bradford, wool processes; in Bolton, cotton spinning and weaving, and so on. But it is the practice to add to these some or all of the miscellaneous subjects mentioned, and thus on the one hand to do the work of the German domestic and lower trade schools, and on the other to attempt the superior functions of the technical high school.

The German schools of this class, on the contrary, are quite clearly differentiated. They are not quite so restricted as the description applied to them suggests. The "weaving" schools, for instance, generally embrace all the main textile processes. But they are strictly devoted to some special branch of industry, and their main function is to enable students, who are to occupy superior positions, to acquire a thorough mastery of the skilled processes. The art-trade schools alone have a considerable number of working-class pupils, but these are also highly skilled hands. In Prussia the schools with which we are concerned are divided into trades thus: Building (*Baugewerkschulen*); engineering and metal trades (*gewerbliche Fachschulen für Metallindustrie*); textiles (*gewerbliche Fachschulen für Weberei*); pottery (*gewerbliche Fachschulen für Töpferei*); art trades (*gewerbliche Zeichenschulen*). The engineering and textile schools are the most important in regard to the manufacturing industries. I have given an account of some of the most prominent of the latter in connection with Barmen (drapery trades), Crefeld (silk and velvet), München Gladbach (cotton), and Aachen (wool), and they may serve very well as examples. Although there is no uniformity among these schools, there is a general resemblance in the scheme. The weaving school in Berlin is somewhat exceptional. The subjects taught are more numerous than usual, and there are evening, as well as day, classes and Sunday courses. The subjects are designing, weaving, dyeing, knitting, lace and embroidery making, the commercial and legal aspects of textile manufacturing. The day courses, which are for manufacturers, managers, and experts, are for one or two years of forty-two weeks, forty-four hours to the week. That is the usual school year. The evening and Sunday courses, which are far more numerous attended, are for workmen, merchants, and tradesmen. The instruction is free to workmen resident in Berlin, which perhaps accounts for the comparatively large evening attendance. In other schools, however, which have Sunday courses at a nominal fee, the attendance is very scanty compared with the evening classes in English textile schools.

Some points to be noticed are the strictness of the regulations and the large amount of time devoted to paper exercises. The pupils are certainly made to work very hard, and acquire a thorough theoretical grasp of the business. Another point is the provision of excellent museums and libraries. Museums are of great value in textile schools, particularly in relation to designing and dyeing. These arts are, I

believe, the most important contributions of the schools to the industries, and they are becoming constantly more important. The German manufacturers pay great attention to both. In a mill of moderate size in Crefeld I found eighteen young men, trained in the textile school, at work in the designing room, and I watched the process of catering for the market. One of the designers was engaged with a customer, a dealer in dress materials, and the two were working out ideas together, making sketches, criticising, and altering. That is how fashions in new materials are evolved. The expert designer and dyer invent ideas and combinations which are submitted to customers, or they translate the ideas of others into practical shape. Single manufacturers will employ from sixty to eighty designers for a period of several weeks in preparation for a new season.

It is only in this way that a hold on the market can be retained. Germans have particular need of carefully trained skill for the work, because they are not naturally inventive or gifted with the innate sense of elegance possessed by the French, if they will pardon my saying so. Consequently the manufacturers give liberal support to the textile schools, and further encourage them by providing employment to graduates. There is no doubt that it pays them. A manufacturer in Elberfeld was showing me one day a length of dress material. "That," he said, "is going to England, and it is made of English stuff. I get the materials from England, manufacture them, and send them back. I pay carriage both ways, and yet I can sell this in the English market." "How do you manage to do it?" I asked. "Well," he said, "you see this is a nice design; there is brains in it." It was a good answer and, I am inclined to believe, the whole answer, for he pays higher wages and more for coal than manufacturers of similar goods in Yorkshire. Our manufacturers often complain that German and other foreign competitors steal their designs, and doubtless it is true. They do the same, and steal French designs themselves. Every nation helps itself to the ideas of others. But it is not possible to go on competing successfully with borrowed brains and secondhand ideas. The nation which is richest in ideas will come out first, and the Germans realize that more thoroughly, I think, than we do. Hence their efforts in this direction. Our own textile schools do excellent work, and so far as affording opportunities to the working classes is concerned, they do far more than the German ones, but they do not command the same superior material. The reason for that is that there is not yet the same inducement to young men who have had a superior liberal education to take up the career of manufacturers' experts. This fact is really at the bottom of the question of scientific education. Given the demand, the supply will follow.

Our technical schools have taken the heterogeneous form they have because they have developed in an unsystematic way to meet the current demand, which is for instruction in all sorts of things for persons of inferior education engaged at work in the day, with a view to "bettering" themselves. The work they do is of great significance, but its broad outcome is far more social than industrial. Those who are dissatisfied with it and point to the German example, make a great mistake in supposing that the lesson to be learned from Germany is to substitute scientific or commercial subjects for a liberal education in early life. The real lesson is to make industrial science a sufficiently attractive career for those who have received a superior general education, and particularly a full classical one. I shall have another word

to say on this head in connection with the technical high schools, but meantime I must return to the main subject, from which I have somewhat strayed.

The engineering and metallurgical schools are numerous and varied. They cater for different trades and for different classes of students. Some are intended merely for shop managers, others for highly educated mechanical engineers. It is from these schools, and not from the technical high schools, that German manufacturing industries now chiefly draw their mechanical engineers. A wrong impression prevails upon this point in England; those who attribute German progress in industrial mechanics to the high school course, which they put forward as an example to be imitated in this country, are not in agreement with the Germans themselves. I found an opinion prevalent among heads of engineering firms that the high school course is too long and theoretical and rather unfits men for ordinary mechanical engineering. Employers bringing up their sons to the business prefer to send them to the higher trade schools. According to a statement made in 1901 by the Association of German Engineers, out of 3,281 employed by 105 of the most prominent works in Germany two-thirds came from these schools and only one-third from the high schools. There are, so far as I can ascertain, 19 such schools in Prussia; 11 are for engineering, 2 for marine engines, 2 for smelting as well as engineering, 3 for small iron and steel manufactures, and 1 for bronze. Those in the Rhine Westphalian district are at Cologne, Elberfeld, Hagen, Siegen, Remscheid (small iron), Duisburg, and Dortmund.

The school at Duisburg is an example of those which belong to the lower grade and cater for the minor class of workshop officials. The course is two years, and pupils are required to have had four years' practical experience before entering. They are taught the theory of machine construction and the metallurgical elements of smelting, refining, and rolling, with the requisite amount of chemistry, physics, drawing, and mathematics. It is entirely characteristic of German education that four hours a week in the first year and two hours in the second are devoted to the German language and law. The students for whom this particular class of school is intended are not men who have enjoyed a superior education; but the position which they are being prepared to occupy is one of more or less responsibility. They will be in charge of other men, and besides possessing superior technical knowledge it is desirable that they shall be superior in other respects, and better educated as citizens. Consequently their general education as such is carefully attended to. It is a good instance of the methodical way in which the Germans keep the whole end in view and pursue it.

At Chemnitz there is an establishment which includes several trade schools of different grades under one roof, and it may serve to illustrate their aims and character. It is called the *Königliche Gewerbe-Akademie und Technische Staatslehranstalten*. The title is rather a mouthful, but it looks less formidable thus, *Royal Trade Academy and State Technical Institutes*. These are separate institutions, and the following account of their origin, kindly furnished me by Professor Fehse, explains the character and evolution of German trade schools so clearly that I quote it in full:

Thirty years ago or more there sprang into existence a kind of schools calculated to give a theoretical instruction to the young men going in for a trade or an industry. These schools were called *Gewerbeschulen*. The diversity of trades caused a

splitting into branches; hence, engineering school, dyeing school, trade drawing school, soap-boiling school, milling school, building school, the last working only in the winter terms, their pupils, aiming at becoming master builders, being employed practically in summer. You are quite right in presuming that these branches are the same as the Fachschulen in Prussia. In Chemnitz they are crowded into one house, under one head, forming altogether the Technische Staatslehranstalten. Conditions of admission are the certificate of a Volksschule and some years or terms of apprenticeship in a trade. In the course of time a higher degree of Fachschule has been organized and added to the Technische Staatslehranstalten for young men who have attended a secondary school and obtained the certificate entitling them to one year's voluntary service (see preceding article). The curriculum takes up seven half-yearly terms, at the end of which time the men who pass their examination get the diploma of an engineer. This school has three different branches—machinery, architecture, chemistry.

Here we have the development from a lower to a higher grade both of study and of student, in response to that demand to which I have referred. The Gewerbe-Akademie of Chemnitz, including as it does several branches of study, resembles the high school type of institution rather than the more specialized (higher) trade schools of Prussia; but its functions and status are the same as those of the latter, and it really belongs to the same group. The Chemnitz Staatslehranstalten represent a lower grade in that group and correspond to the Duisburg engineering school described above, except that they teach a number of different subjects. The departments include building, the mechanics of various manufactures, and drawing. Except the last, the classes are held in the day. The course is one and a half or two years and the fees from 10s. to 30s. [\$2.43 to \$7.30] the half-yearly term. The fees at the Akademie are £3 [\$14.60] the term for Germans and £6 [\$29.20] for foreigners. The total number of pupils at both institutions in 1900 was 1,031, of whom 404 were at the Akademie and only 50 in the evening classes.

One might go on indefinitely describing other institutions of a similar character, but probably enough has been said to give a fair idea of the part played by this group of schools in industrial life. I should add, however, that the pupils must, as a rule, be over 16, if not older, and have had previous practical training in their business. The Germans have no belief in the American plan of teaching trades wholly in schools. With regard to finances, these schools are supported by fees, endowments, municipal and State grants, but the general tendency is toward more and more State support and State control.

TECHNICAL HIGH SCHOOLS.

I have very little space left for this important subject, but fortunately it is becoming so well understood in England that there is no need to say much. These institutions, of which there are nine, with two more in preparation, represent a further step. As the superior grade of trade schools has been developed from a lower, so the high schools have been developed from trade schools to meet still higher requirements. They have the status of universities, are self-governing, and do for the industrial professions what the universities do for the learned professions—that is, impart the highest training in those principles which form the theoretical groundwork of practice. We here see again the German tendency to specialization and (what amounts to the same thing) their method of providing new institutions adapted to a particular end, not in substitution for the old, but in addition.

The technical high schools do not supersede or overlap with the

universities, they supplement them; just as the Realschulen, or modern schools, relieve but not supersede the Gymnasien, or classical schools. This does not seem to be understood in England, or the example of Germany would hardly be cited in support of the demand for turning our older universities into academies of science and abolishing Greek and Latin in our public schools. That is exactly what Germany has not done, and a striking fact in connection with the higher scientific education is that the full classical and half classical schools contribute far more students to the most advanced technical high schools than the modern schools do. Mr. Rose has recently pointed that out in his admirable report on the subject. Out of 2,736 students at the Prussian high schools in 1899, the distribution was: From gymnasia 1,406, from real gymnasia (semiclassical) 1,065, from upper real (modern) schools 265; and of the candidates recently examined for the position of State engineer the proportion was: From gymnasia 70 per cent, from real gymnasia 27 per cent, and from real schools only 3 per cent. At the Berlin high school, which occupies a more distinguished position than any other, only 4 per cent of the students in mechanical engineering came from modern schools. Whatever the immediate causes of this state of things may be, it is another proof of the value attached in Germany to an all-round education as a preliminary to specialization.

The high schools have no uniform curriculum, but all of them teach architecture, civil and mechanical engineering, chemistry, mathematics, and physical science. Exceptional subjects are naval architecture (Berlin), mining (Aachen), forestry (Stuttgart), and agriculture (Munich). Pharmacy is taught at Brunswick, Karlsruhe, and Stuttgart; and at the last-mentioned place there is a railway, post, and telegraph course. Previous practical knowledge is generally required, as in the trade schools, and more rigidly insisted on. The high school is even less than the trade school a substitute for apprenticeship.

The services rendered to industrial Germany by these institutions are doubtless very great; but I can not help thinking that in regard to manufacturing industries the German high school has become rather too much of a fetich to many people in England. I have already pointed out that in mechanical (excluding electrical) engineering it is thought to go too far by German manufacturers; then the departments of architecture, civil engineering, mathematics, and general science, however valuable in their place, would not help us in the least. The two really important departments, from this point of view, are chemistry and electrical engineering. It is impossible to exaggerate the importance of the first; it enters into every branch of manufacture and becomes more potent every day. At the high school teaching and experiment are pushed to the furthest theoretical limits, and the value to Germany is incalculable. Her chemical industries are reckoned to bring in fifty millions a year, but the application of chemical knowledge goes far beyond that and extends into a thousand channels. Nor can any man tell what it may bring forth to-morrow. This is the great lesson in industrial science that the high school has to teach. But it must not be forgotten that chemistry can be, and is, equally well taught at the universities. So, too, electrical engineering, which has also been of immense value to Germany; but her rapid industrial advance in that line, compared with ours, is due less to superior knowledge than to the gratuitous retardation of the home industry by Government regulations.

16. FINAL ARTICLE.

Having reviewed the main conditions of industrial life in no small detail, subject to the conditions laid down at the outset, I would gladly leave the reader to form his own conclusions from the facts, which have, I may say, never been put together before either in Germany or elsewhere. But it is not easy to focus a large mass of data dealing with various aspects of social life unless they have been long in mind, and perhaps some kind of summing up will be expected. Before attempting it, however, I will first take the opportunity to add a few points which have been omitted for want of space.

MUNICIPAL ENTERPRISE AND TAXATION.

A correspondent has requested some further information on this subject, and I will endeavor to supply it. I have more than once referred to the multifarious and extensive functions exercised by the municipal authorities in Germany, and in the first article, on Düsseldorf, I gave a list of those carried on in that town. It may be taken as fairly representative, for though there is considerable elasticity and variation in the practice of different towns in regard to some matters, the great majority of the duties mentioned are uniformly undertaken, and occasionally some others in addition, such as labor registries, of which a short account is given below. In any case, the responsibilities placed upon a town council are much greater in Germany than in England. Yet municipal activity in Germany has, generally speaking, nothing to do with "socialism," and is often most highly developed in localities where there is not a single socialist on the council. Even in towns which are strongly socialistic, when judged by the Reichstag elections, the administration of local affairs may be quite free from any influence of the kind, and the number of socialists on the council insignificant. I have generally found that to be the case in the industrial towns with which I have been dealing. This is quite intelligible when the position is considered.

In Germany socialism means Social Democracy, which is essentially a class warfare, based upon a quasi-philosophic economic theory and carried on in the political field. It demands the abolition of "capital" and the substitution of collective ownership by the State. It does so on the ground—and on no other ground—that so long as the capitalist class exists the condition of the people must be miserable and must become worse and worse. Obviously the end can only be attained by political action or a general revolution, and local affairs have no bearing on it. They are therefore administered for the benefit of the community as determined by circumstances, not by theoretical considerations. That, at least, has hitherto been, and still is, generally the case, although there are signs that as the neck-or-nothing programme declines in favor socialistic energy is being turned into other

directions, of which municipal administration is one. That movement, however, is young and of small extent. As things stand local affairs are not administered on the assumption that the abolition of private enterprise and the substitution of communal control is an absolute good in itself, whatever the result; and consequently municipal activity, though more extensive and responsible than in England, does not include so much trading. Perhaps this is one of the reasons why there is much less scandal in connection with it.

I see it frequently stated that protective tariffs lead to corruption in public life which is avoided by free trade—that does not hold good of Germany. It is impossible to say that there is no corruption in public life, because a universal negative can not be proved; but there is certainly less jobbery in municipal life, less manipulation in favor of individuals or of classes than in England. The administration has an eye more single to the general welfare of the community and is more efficiently conducted. The proofs, both positive and negative, are numerous, but I must content myself with two points—electric lighting and public baths. Both are superior to the installations in corresponding English towns, and yet they pay. Out of 20 large towns in 1899 I find that 16 showed a net profit—in some cases a very large profit—on their electric installation, and only 3 a comparatively small loss. Out of 18 towns with full public bathing accommodation (swimming baths, single baths, and shower baths), 13 earned a profit and 5 made a loss. The aggregate net profit on electricity was £78,400 [\$381,534], and on baths £3,216 [\$15,651]. The trading of English towns (local government board return, 1902), resulted in a net loss of £11,707 [\$56,972] on electricity and of £124,952 [\$608,079] on baths. The comparison is rough, but I believe it fairly represents the relative efficiency.

One reason for the healthy state of municipal administration is probably the system of taxation, which is so arranged that bad management or extravagance is brought home to classes which remain in ignorance under the English system of raising rates. The chief source of revenue for the local community, as for the State (distinguished from the Empire), is income tax, which is levied on all persons having an income of £45 [\$219] a year and upward. Taking Düsseldorf as an illustration, I find that in 1902 the income-tax payers, together with their families, represented more than three-fourths of the population; and those with incomes from £45 [\$219] to £150 [\$730] were 89 per cent of the total number. The tax is graduated so that the chief burden falls upon the wealthier members of the community, and those with incomes over £150 [\$730] though less than one-fourth in numbers, pay more than three-fourths of the whole revenue; but the poorer members are equally conscious, in their degree, of a direct interest in good administration. In England though they contribute probably more, the payment is made indirectly through the rates, which are lumped together with the rent, and so escape notice. The poorer householder, when the rates go up through maladministration, only knows that his rent is raised, and puts it down to the greed of the landlord.

Municipal income tax provides rather more than the municipal revenue in most towns in Prussia, but there are wide variations, which are still more marked in other States. In Bavaria it only amounts to one-fifth of the local taxes; in Württemberg it is even less, but in Saxony

it rises to four-fifths and more in individual towns. Incomes below £45 [\$219] are sometimes taxed. The other taxes are partly direct and partly indirect. The most important are levied on "ground and buildings," "trade and business," conveyance, food and drink. The last is generally low in Prussian and Saxon towns, and higher in other States.

LABOR REGISTRIES.

Municipal authorities are showing an increasing tendency to add to their other functions the administration of labor registries or information offices, which are one of the many organized efforts for assisting the laboring classes. Out of 44 large towns having such offices in 1900 I find that in 24 they were under municipal management. The rest were carried on by societies consisting of employers, business and professional men of all kinds, and philanthropic subscribers. Breslau had two institutions—one carried on by the town, the other by the mendicity society. The object is to bring employers in want of labor and workmen in want of work into communication. The employers register their requirements, wages offered, etc., and the workmen their capacities and experience, with other details, such as age, and cause and length of unemployment. The office sends suitable applicants to suitable places on the list, and the service is gratuitous. When trade is good and the labor market busy the number of vacancies far exceeds the number of applicants, and under opposite conditions the reverse obtains. In Düsseldorf, for instance, the number of vacancies was 30,892 and of applicants 6,459 in 1900; whereas in 1902 the number of vacancies had fallen to 7,891 and the number of applicants had risen to 53,579. In the intermediate year the numbers were pretty nearly equal, and no doubt it is in such conditions that the office is able to perform the greatest service. In that year the offices throughout Germany found places for 366,474 persons. Taking the previous year, for which more detailed figures are available, I find some notable results in single towns: Number of situations filled—Munich, 53,409 (18,191 women); Hamburg, 45,298; Berlin, 40,656; Dresden, 28,333 (24,389 women); Cologne, 22,345; Frankfort, 20,926. With the exception of the first and last, all these were offices conducted by societies. The towns mentioned are all large trading centers.

The activity of the registries appears to be less in the manufacturing towns, but in the Düsseldorf district 13,204 places were found in the year ended June, 1902, when the depression was very acute. The returns from the principal towns were: Barmen, 4,096; Essen, 2,479; Düsseldorf, 2,138; Elberfeld, 1,903. I regret that I have no returns for last winter, when the number of unemployed applicants was very great; but I think it is clear from the facts given that the labor registries perform a real and practical service. They would no doubt do more if there were a more centralized organization, bringing different towns and districts into communication. A good many of them—notably that at Berlin—have waiting rooms open to applicants at certain hours or all day. This is a real boon to the unemployed in search of work. It is hardly necessary to say that professional cadgers are not allowed to parade the streets in gangs under cover of prevailing lack of employment. Relief work on the roadways or in stone breaking is sometimes provided, but not to any large extent. An experience noted at Mannheim last winter is not much more encouraging than

similar ones in England. Relief works were started and 1,093 men applied; 289 refused the work offered; 394 were taken on, of whom 173 left of their own accord; 47 were stopped by frost; and 5 were discharged; only 169 remained at work.

LOCOMOTION.

This is a matter of much importance to the working classes. Electric trams are now universal, not only in towns, but between them, especially in industrial districts; and they are an immense convenience to the poorer population. They link up the towns with the country and with one another, and enable factory hands to live on the outskirts or quite outside, where housing is cheaper. In Chemnitz, for instance, many of those employed in factories inside the town live in the surrounding villages, where they get more accommodation for about one-half the rent. We have exactly the same thing in our own industrial districts, and some of the services in Staffordshire, Lancashire, Yorkshire, and Northumberland are as good as those in Germany or America; but both countries were considerably before us in point of time, thanks chiefly to the now discarded regulations of the board of trade—a good example of the injudicious interference with industrial enterprise which distinguishes British Government departments from all others and seriously handicaps British manufactures. Consequently their systems are more complete; and the countries being greater in extent, the distances covered are greater. In the West Riding of Yorkshire you can already travel by tram from one town to another for some 30 miles, and I believe that before long they will all be linked up from Manchester to Leeds; but we have not yet got the electric trams on a direct fenced track, as they have both in Germany and the United States. In the latter country electric tracks run for 300 miles out in the middle West.

With regard to fares, they are lowest in England for short distances and for long ones in Germany, where there are no halfpenny fares, or even penny ones. The unit is 10 pfennigs, which is one-tenth of a shilling, but for that you can often travel for miles. Municipal services are frequent in Germany, but the very best service I have met with in any country is at Dresden, where the working is leased to two companies, which take a percentage of the profits earned. This system combines the advantages of public ownership with private management, which is stimulated by the mode of payment, while the engagement with two companies provides a means of checking the operations of each. The electric system most in use is the overhead wire, but the connection is not made with a trolley or running wheel, which is apt to leave the wire, but by a flattened loop of stout metal, which is carried at right angles to the wire, brushing along its under surface, and is too wide to glance off. In some towns—Berlin, Düsseldorf, and Dresden, for instance—the overhead wire is combined with the underground slot system, or with accumulators in those parts of the town where one or the other seems preferable. The overhead trolley is almost universal in England and America, except in New York, where wires are eschewed. In New York, by the by, there are still numerous horse trams in the heart of Manhattan. There is another system—the “surface contact”—but I have only met with it in Wolverhampton; it appeared to work admirably. The “trust”

system of fares is adopted at Chemnitz, and, I believe, some other places; there is no conductor, and passengers put the fare in a box. It is calculated that only 5 per cent is lost through dishonesty, and that the system is more economical than paying conductors. The cars in Germany, as in America, are single deck, with roomy covered platforms fore and aft on which passengers are allowed to ride. This arrangement is vastly superior to the cumbrous, inconvenient, and unsafe double-deck cars, with the purely vexatious prohibition of riding on the platform to which all the English tramways adhere for some mysterious reason. The electric hanging railway at Elberfeld has been fully described in the account of that town.

With regard to other traveling facilities, the German railways have greatly developed and improved, and the trains are now quite numerous in busy and populous districts; but the third and fourth class accommodation, though cheap, is very uncomfortable, and the trains are slow. If all the factors are taken into consideration, the English railways give an incomparably better service than any others. England is the only country in which railway traveling is provided that is at once fast, frequent, cheap, and comfortable; everywhere else cheap travel is neither fast, frequent, nor comfortable. The running is very much smoother on our principal lines than on the best in Germany and the United States; but the larger carriages in use there are more com-
modious than ours.

CONCLUSION.

I will spare the reader any statistical proof of the industrial development of Germany in recent years. The real significance of the story can not be expressed in figures, striking as they are. In a comparatively short time Germany has become one of the great workshops of the world, and has secured a place in the front rank of manufacturing nations with but little assistance from nature and in the face of many difficulties. It is not a rich country; its natural resources are moderate; its position is disadvantageous for trading; it has enjoyed peace for but thirty years; it has never enjoyed security, and tranquillity has been purchased at the cost of an immense military burden. In all these matters it presents a striking contrast to the United States, which has had every conceivable advantage. Then, its people are not particularly inventive and have not fashioned for themselves superior weapons in the shape of new mechanical appliances and revolutionizing processes, like the earlier inventions of England and the later ones of America. Nor do they possess exceptional skill in special directions like the French. Even in science, wherein their intellectual strength is greatest, they have no general advantage over England and France; for all three countries can show records of equal luster whether in physical or biological science. And yet Germany has advanced from comparatively small beginnings so rapidly that she now does what no other country, though possessing superior advantages or fewer difficulties, can do; she successfully challenges England in nearly all the great branches of industry in which England is or was strongest. Other countries challenge in this or that, or they have special lines of their own; Germany is an all-round competitor, and the most formidable we have. And not we only; she competes with other countries in the products in which they are strongest—with the United States in electrical machinery and small machine tools, with France in dress

materials, as she does with England in shipbuilding and large machinery. To complete the tale, I must add that while doing this and maintaining the most powerful military system in the world, Germany has at the same time modernized, regulated, and improved the conditions of civil life more completely than any other country. She has done all those things in the way of sanitation, public health, street architecture, and public order that other rising industrial countries, and conspicuously the United States, have been too busy to do.

This is not an expression of opinion or a fabulous tale, but a simple summary of facts. I do not say that the picture has no dark side. On the contrary, I think it has, but I do not find that side darker than elsewhere. Germany is not altogether in a healthy state. No country in the front of western civilization is, but the signs of weakness usually pointed out, namely, social democratic discontent and financial difficulties, are not symptoms of serious disease, according to my diagnosis. The real disorder is more subtle and deeper seated. I will refer to it again presently when I have said what is to be said about the industrial development.

How has it all been done? What is the secret? Half the answer—the industrial side—is scattered about the previous articles; the other half—the commercial and financial side—is outside this inquiry. But from half the answer the other half can be inferred. The secret does not lie in this thing or in that, as we are so often told, nor can it be formulated under two or three heads or half a dozen; but it can be compressed into one word—work. Not work in one or two directions by one or two classes, but work all round from top to bottom—from the Kaiser to the workshop apprentice. The Germans have been forced to become a manufacturing and exporting nation in order to support themselves. They have deliberately bent all their energies to the task; have brought their best mental gifts—science, order, method, forethought—to bear upon it, and have spared no pains or sacrifice to accomplish it. First the Government. It has always kept in view the duty of fostering industries, and it never misses a point or loses a chance of fostering them. Hence the judicious factory legislation, the great insurance scheme, the educational system (which really is a “system”), and the carefully devised tariff, with numerous minor points of policy, both active and passive. Then the manufacturers. They have pushed resolutely forward point by point, taking advantage of everything that might help them; they have studied the market with ceaseless vigilance; they have encouraged advance by scientific research, artistic training, and manual skill; they have sent their young men wherever they could best learn; they have provided good working conditions and have supported innumerable institutions for the welfare of their work people. The traders have been no less active in their way, and the teachers of all grades have brought equal diligence and capacity to bear upon their important functions. The general body of citizens have contributed indirectly to the general result through the faithful exercise of municipal duties, the poor-law administration, and the numerous institutions, such as the labor registries, all of which tend to the well-being and efficiency of labor.

As for labor itself, I have good reason to believe that German employers consider their work people one of the greatest advantages they possess over British competitors, not in skill, but in conduct. They regard the prospects of competition with serenity, and would, I

believe, in many industries willingly consent to shorter hours and higher wages so long as they retain that advantage. Now, the Germans are good workmen, though slow. As regards mechanics, I have the testimony of first-rate English and American judges, who have employed them or seen them at work in the shops or have examined their handiwork. All have given me the same answer—"The German is a good mechanic." In some textile processes they have not yet the skill of the English, and in other respects they are perhaps less efficient. But they keep the rules and do their duty faithfully, which is far more important. Their condition, and the condition of any class, can not be judged by statistics. They have a less easy time than workmen in England. They have less leisure, fewer amusements, less money to spend on them, and more to pay for a good living. If this is being "worse off," then they are worse off. But if that phrase refers to their actual well-being, then I have no hesitation in saying that in the mass they are better off. German workmen can not make £10 [\$48.66] a week (with no income tax to pay), like platers on the Tyne, nor do they maintain an army of bookmakers in affluence out of their superfluous means; but the squalor and dilapidation, the degradation and filth, the dismal misery which disfigure most of our larger towns can not be found in Germany. If anywhere, they would be met with in Hamburg, for great ports are the favorite homes of misery. But some years ago, when conditions were less favorable than they are now, I made an inspection of the worst quarters in Hamburg, including the lowest lodging houses and night shelters, and came to the conclusion that there was in the place no poverty of the kind to which we are accustomed.

The German commission which recently visited some English towns to examine housing conditions is reported to have expressed much the same opinion. The difference is due partly to the habits of the people and partly to the institutions for preventing destitution, among which the poor-law system and the State insurance, both of which have been fully described, are the most important. The latter, which distributed last year nearly £22,000,000 [\$107,063,000] among the sick, injured, infirm, and aged, must of itself have a powerful effect in preventing misery; but neither it nor the poor law would be of much avail if it were not for the absence of wastefulness among the people. Those who infer from the facts about hours of work, wages, and cost of living that the laboring classes in Germany are living in a state of misery compared with our own, and that they are consequently on the verge of a social upheaval, deceive themselves. If misery is to cause a social revolt, there is more material in England and the United States than in Germany.

When all the circumstances are considered it becomes apparent that the industrial development of Germany is no rickety structure, hastily run up with a showy outside and rubbish within, but a singularly solid and stable edifice. It is based on the rock of a vigorous national vitality, attested by the increasing excess of births over deaths; it is built up foursquare, braced and buttressed round with all the defenses that the most thoughtful and methodical race in existence can devise. The plan is deliberate, for the Germans recognize that what they call "Manchesterthum" and we Cobdenism—the principle of "go as you please" and "the devil take the hindmost"—is dead, and they act logically upon the conviction. One of the buttresses is the protective

tariff, which represents a great contribution by the nation at large. They adopted it because they found it indispensable after trying to do without it, and the result has fully vindicated the sagacity of Bismarck. The nation has been repaid for the sacrifice by the ability to support its increasing population in health and vigor at home, which means increased strength and efficiency. The material advantage is widely but no doubt unequally distributed; the manufacturing and trading interests have obtained more than a fair share. Hence the social unrest, brought to light by the last Reichstag elections. It signifies an impending struggle for a more equal adjustment of the spoils and of the burden. That might seriously damage the industrial stability of the country if its foundations were less securely laid; but looking to all the circumstances I believe it may be confidently expected that an adjustment will be gradually effected without any great disturbance. Nor need much significance be attached to recent signs of financial weakness, with which competitors or critics have solaced themselves. A few financial storms will not stop the deliberate march of German industrial progress. The anonymous author of a remarkably clear little book—"The German Empire of Today"—has proved himself a sound prophet and observer. Writing in 1901 he said:

It is not expected that the present state of affairs will terminate in a crisis of any kind. German trade, like that of other countries, has already passed through periods of depression, but hitherto it seems never to have been quite so seriously affected as has been the case in some of the older industrial nations.

I have endeavored to give the reasons for this stability. The rivals of Germany will do well to recognize that her competitive capacity is only emerging from infancy and will steadily grow in strength.

The one thing that would really hurt Germany is overprosperity. There are signs—some of them very ugly signs—that the Germans are no more proof against the demoralizing influence of prosperity than any other great nation. The Emperor's constant exhortations to the strenuous life seem to show that he is fully alive to them, as are many other thoughtful and observant men. Hitherto, however, the gospel of ease—to get as much and do as little as possible—has not met with general acceptance as the true guide of life. Work, duty, and discipline are still preached as they used to be preached by the English moralists—Carlyle, Ruskin, Kingsley, and others—thirty years ago. Perhaps this accounts for the sensational and unprecedented success of that remarkable novel "*Jörn Uhl*." It is a simple tale of peasant life, concealing a profound, sympathetic, and powerful study of human nature, by a country pastor, and the moral is summed up by the old farm housekeeper as the peasants trudge home after hearing a sermon—"Well, I suppose we must just go on working till the evening, and be as good and kind as we can." That is the book—the antithesis to everything modern in literature—which has just taken the German public by storm, as no novel has ever done before. The fact has no little significance. The spirit of the nation is still imbued with regard for the higher things in life, and the compelling need of effort and sacrifice imposed by military defense and commercial warfare will probably keep it at least as healthy as its neighbors for some time to come.

EDITORIAL ON THE "INDUSTRIAL CONDITIONS IN GERMANY."

(From the London Times of December 28, 1903.)

We publish to-day the last of the extremely instructive series of articles from a correspondent on industrial conditions in Germany which have been appearing in our columns during the autumn. They have dealt with a subject which is of the greatest interest to all Germany's competitors in the industrial race, and certainly not least to Englishmen. All of us, no doubt, have formed some general conception of the capacities of industrial Germany. But few probably, except those whose active interest in business gives them practical and sometimes painful acquaintance with Germany's products, have anything like an intimate knowledge of the volume and variety of her output, and fewer still are able to form an accurate picture of the conditions under which her working population live. It is some account of this important subject which our correspondent has endeavored to supply. The field is, of course, too vast to cover entirely within manageable compass, and the descriptive detail in these articles has been of necessity practically confined to the two chief industrial regions of Germany—the Rhineland and Saxony. But it has been supplemented by our correspondent with a wide-reaching survey of all the chief problems presented by the conditions under which the German worker lives. Taken altogether, this forms a compact mass of material to draw upon for purposes of information and comparison. It will have enabled the reader to form some picture of places which the English tourist usually passes by on the other side—those remarkable sister communities and rivals in manufacture, Elberfeld and Barmen; the extraordinary center of industry called into being by the genius and laborious energy of the Krupp family at Essen; Saxon Chemnitz, the largest single town of the pure industrial type in Germany, and a host of others.

The English inquirer, if he finds the general state of industrial housing in Germany markedly unsatisfactory as far as working-class homes are concerned, may yet learn something from the high average of cleanliness and order in the factories and foundries where the German artisan works. He may be tempted to feel some envy for the way in which the factory legislation of Germany has held the balance between the two objects of protection of the worker and promotion of the industry, and has succeeded in avoiding much of the cast-iron regulation which handicaps us here. He may envy, again, the very successful manner in which, in her dealings with pauperism, Germany seems to have managed to eliminate the tramp, and he will certainly not refuse admiration to the high standard of voluntary effort attained by the local administrators of her system of out-door relief. Of all the points of interest for comparison, however, there is none more outstanding than the German educational system. At a time when we are being urged to secularize, or at least to undenominationalize, our elementary schools on the one hand, and to augment our technical

schools or modernize our universities on the other, it can not but be profitable to note the care Germany takes to coordinate her technical education and to retain its liberal basis, and in her primary schools to preserve religious teaching, and dogmatic religious teaching, as the most effective groundwork of the sense of personal duty.

Of course there are shadows in the picture. We have merely been indicating some points in which we may learn from Germany, if we do not imitate her. When all is said, industrial Germany remains a very remarkable achievement. Its creation since the struggle of 1870 is in some respects a result more striking even than Germany's political unification. Germany, as our correspondent observes in his final article this morning, is not a rich country; she has never felt security; her people are not particularly inventive; yet she has made herself a competitor and a successful competitor with us in almost all our great branches of industry, and in addition she competes with other manufacturing countries in their strongest lines of production. What is the secret of this performance? At bottom it is, no doubt, what our correspondent affirms it to be—strenuous devotion to work. But work in itself may be chaotic or misdirected, and involve an immense waste of energy. The reason why German work has proved so productive is that it is systematized work. The whole fabric has been elaborately organized for the promotion of efficiency. It is apparent in the vigilant enterprise of German manufacture. Here some of our own fellow-countrymen might do well to copy them, for, though we believe that much greater causes are contributing to the threatening of England's commercial position, yet the articles we published some time ago on the crisis in British industry showed plainly enough that some of our manufacturers did not do all they might do to keep abreast of their rivals. But the chief evidence of the way in which deliberate organization permeates all industrial Germany is to be found in the action of the Government. Its factory legislation has carefully avoided the hampering of production. It has provided an effective instrument for the welfare of its working classes in that remarkable system of insurance which combines the principles of State aid, compulsory thrift, and employers' liability. It has devised a complete and carefully graduated system of education, which, as our correspondent says, really is a "system." Last, but not least, it has its tariff, adopted as a weapon of industrial defense because it was found indispensable, and maintained because it is regarded as a buttress of the national prosperity. Germany has, in fact, disregarded more completely than any other country the old shibboleths of *laissez faire* which opposed the citizen, conceived as an abstract individual, to the State. It sums up those conceptions characteristically in the single word "*Manchesterthum*," and it has rejected them entirely.

It will inevitably be asked what light the actual conditions of industrial Germany throw on the fiscal controversy which we are at present passing through here. Any inferences on this subject must be drawn with the greatest caution. The circumstances were so different at starting, and they still exhibit so much diversity, that comparison and illustration must necessarily be pursued within limits and with the utmost care. One result, however, our correspondent's articles do seem unquestionably to establish. They dispose of the argument, sometimes urged in the course of this controversy, that the condition of the German worker is so miserable that the adoption of a tariff

here would probably spell ruin for our industrial classes. Our correspondent's investigations have led him, for example, to the conclusion that while wages have increased steadily under the German protective tariff, the cost of food has shown no such corresponding rise. Wages in Prussia he finds but little lower than those here, and in some cases, as, for instance, in the Solingen cutleries, the skilled German worker is earning, if anything, rather more than his competitor at Sheffield. The wages of steel workers at Essen and coal miners in Westphalia continue to rise. The German artisan has less leisure and fewer amusements than his English brother, but his progressive vitality is plainly attested by the growth and vigor of the population. Further, it may be said once more that in Germany, at least, protective tariffs have not produced that corruption in public life which we are perpetually told would be our destiny under a tariff here. Of poverty of the worst description there is probably less in Germany than in England, and what social discontent there is certainly does not indicate a general popular rebellion against the tariff system. The great successes of social democracy in the elections of last summer are to a great extent significant of quite different causes. Social democracy is mainly a protest against the class system which still predominates in German life, and partly the expression of that natural striving after a more equal distribution of the goods of the world which is to be found in some form in almost every society. The theoretic doctrines of socialism have but slight hold on the imagination of the Germans, who, despite the possibly demoralizing inroads of prosperity, appear still in the main to be devoted to the old conceptions of work and civic duty as they have hitherto known them.

APPENDIX.

TECHNICAL SCHOOLS IN ROUBAIX AND LILLE, FRANCE.

(From United States Consul Atwell, Roubaix, France.)

The closing on August 28, 1904, of the yearly exhibit of work done by the pupils of the National School of Industrial Arts, at Roubaix, seems an opportune occasion to discuss further the opportunities existing in Roubaix and adjoining towns for practical technical instruction.

ROUBAIX.

INDUSTRIAL PRIDE IN ROUBAIX.

Roubaix is a vast hive of busy workers. Manufacturing is the life of the place, and it is to the interest of those most prominent and active in affairs to furnish every facility to the rising generation to increase the prestige already acquired by the town in the production of high-class work of artistic design.

In America, where there is such an influx of foreigners and consequent blending of races, it is difficult to understand the racial pride that enters into the manufacturing spirit in such centers as this. The same industry is handed down from father to son, each one being equipped in turn by technical instruction, in addition to a collegiate course, so that a high order of intelligence directs the industry, which becomes the pride of the Roubaix family. To excel artistically as well as to succeed commercially is the object for which the Roubaisien strives, and it is with this object in view that he gives his time and money freely to the fostering of technical schools.

NATIONAL SCHOOL OF INDUSTRIAL ARTS.

The National School of Industrial Arts of Roubaix was created by an agreement between the French Government and the town of Roubaix, signed November 28, 1882. This school includes a school of design similar to the National School of Decorative Arts of Paris; public instruction in physics and chemistry as well as mechanics; a course in the art of dyeing, including instruction in coloring matter, as taught at Mülhausen; also courses in weaving, spinning, and tapestry. Each section in the above branches of instruction has laboratories and workshops for the practical application of instruction.

The school includes also an industrial and art museum, a library of 10,000 volumes, and a collection of models, machines, and appliances

for demonstration. Finally, there is a hall capable of seating 650 people for public lectures on art, science, the history of tissues and other decorative industries, geography, and music.

The principal of this school, who is named by the minister of public instruction, is under the direction of a board composed of a president, who is prefect of the north, a vice-president, the mayor of Roubaix, the president of the chamber of commerce, and a lawyer of note nominated to the post. Nine members from the class of manufacturers, weavers, engineers, and architects are elected, one-third being subject to reelection every two years.

On July 6, 1903, the Government issued a decree for the creation of a committee of initiative and protection of the National School of Industrial Arts of Roubaix. This committee is composed of thirty-five of the most prominent Roubaisiens engaged in industrial and mechanical pursuits, and of artists, graduates of the Roubaix school.

The National School of Industrial Arts is a free school and has night and day classes. The night classes are designed more particularly for youths occupied during the day who seek to become skilled workmen, designers, overseers in mills, and heads of factories. The intention is to give to them such thorough instruction that they may become competent to fill situations demanding intelligence and capacity. It is also the aim of this school to give to youths with time to devote to higher education instruction that shall enable them to become artists, chemists, dyers, spinners, creators of tissues, men capable of solving the most complicated problems of modern industry.

The number of pupils in 1903 was 988, the largest number registered since the foundation of the school.

Pupils desirous of entering the school must request of the secretary the privilege through their parents or guardians. This request must be accompanied by a certificate of birth. Foreigners whose families reside in France will be admitted in the same manner, but they must have in addition a letter of recommendation from the representative of their nation, and must prove that they have fulfilled the requirements of the act of October 2, 1888, or the law of August 8, 1893, relative to the sojourn of foreigners in France. The applicant must have completed his eleventh year, must know how to read, write, and calculate in order to enter the classes in preparatory and linear drawing.

A definite idea of the course of instruction given in the National School of Industrial Arts may be formed by consulting the following table:

Courses of instruction for the school year 1903-4, in the National School of Industrial Arts of Roubaix.

Subject.	Time.
DIVISION FOR YOUNG MEN.	
DRAWING.	
Preparatory class. Outline drawing. Notion of perspective..	Daily, except Monday, 6 to 8 p. m.
Bust division:	
Elementary class. Drawing from antique and plants.	Daily, except Monday, 6 to 8 p. m.
Perspective.	
Middle class. Figure and ornamentation	Daily, except Monday, 8.30 to 9 p. m.
Drawing from antique and nature. Anatomy	Daily, except Monday, 6 to 8 p. m.
PAINTING.	
Figures, flowers, ornamentation	Daily, except Monday, 10 to 12 a. m.,

Table of instruction for the school year 1903-4, in the National School of Industrial Arts of Roubaix—Continued.

Subject.	Time.
DIVISION FOR YOUNG MEN—Continued.	
SCULPTURE.	
Modeling from antique. Practical work on stone, wood, etc.. Natural elements, ornamentation.....	Daily, except Monday, 8 to 9.30 p. m. Daily, except Monday, 3 to 4.30 p. m.
DECORATIVE AND INDUSTRIAL COMPOSITION.	
(Pupils in painting, sculpture, architecture, and weaving—second year—are entered officially for this course, unless prior permission has been given.)	
Study of style. Exercises in ornamental application. Theory of decorative composition.	Daily, except Monday, 8 to 10 a. m.
ADVANCED COURSE IN DECORATIVE COMPOSITION APPLIED TO TEXTILE INDUSTRY.	
(Graduates of this course receive a diploma as Designers of Textiles.)	
Form. Study of natural plants. Synthesis and style proportion. Equilibrium. Character.	Every Sunday from October 10, 9 to 12 a. m.
Color. Simple and composite colors. Derivative colors. Study of values, comparisons, and harmony.	Every Sunday from October 10, 9 to 12 a. m.
Composition. Laws governing composition and their application in the manufacture of tissues. Floral and ornamental combinations.	Every Sunday from October 10, 9 to 12 a. m.
GEOMETRICAL DRAWING.	
Linear and geometrical drawing.....	Tuesdays, Wednesdays, Fridays, and Saturdays, 6 to 7.30 p. m.
ARCHITECTURE.	
Studies. Exercises in composition	Daily, except Monday. October to Easter, 6 to 8 p. m.
General construction.....	Daily, except Monday. Easter to July, 6 to 8 p. m.
HISTORY OF ART.	
(This course is obligatory, except in case of exemption, for girl students and pupils studying decorative composition, painting, drawing, architecture, and sculpture.)	
Practical exercises. Sketches and essays.....	Mondays, 5.45 to 6.30 p. m.
Public lectures illustrated by magic lantern slides.....	Mondays, 7 to 8 p. m.
MATHEMATICS.	
(This course is obligatory for pupils studying mechanics and architecture unless examination has proved their efficiency.)	
Arithmetic, algebra, geometry.....	Tuesdays, Wednesdays, Fridays, and Saturdays, 8 to 9 p. m.
Descriptive geometry:	
Elementary course.....	Wednesdays, 6 to 7 p. m.
Advanced course.....	Fridays, 6 to 7 p. m.
MACHINE DRAWING AND APPLIED MECHANICS.	
First, second, and third courses	Daily, except Monday, 7 to 9 p. m.
CHEMISTRY AND PHYSICS.	
(Pupils following this course must be at least 14 years old.)	
Study of acids, alkalies, metals, building materials, food stuffs, etc.	Two Wednesdays and one Friday every two weeks, 7.30 to 8.30 p. m.
Water in manufacture. Heating, private and public. Gas...	Two Fridays monthly, 7.30 to 8.30 p. m.
Manipulation in industrial chemistry.....	Wednesdays and Fridays, 8.30 to 11.30 p. m.
ELECTRICITY IN MANUFACTURING.	
Conservation and transformation of force; electric currents, resistance, intensity, induction, generation of electric force, canalization, and distribution, 30 lessons, in the large hall, beginning October 22.	Thursdays, 7.45 p. m.

Table of instruction for the school year 1903-4, in the National School of Industrial Arts of Roubaix—Continued.

Subject.	Time.
DIVISION FOR YOUNG MEN—Continued.	
DYEING.	
(An examination in chemistry must have been passed by those who wish to take this course.)	
Theoretical course, 120 lessons. Water, soap, alkalies. Bleaching of animal and vegetable fibers. Methods and materials used in dyeing. Study of coloring matter. Dyeing of wool, silk, cotton, feathers, flowers, leather, etc.	Daily, except Monday, 8.30 to 11.30 a. m.
Practical course and manipulation, 200 lessons. Methodical exercises in dyeing wool, cotton, etc. Printing. Finishing.	Daily, except Monday, 2 to 3 p. m.
WEAVING.	
(To follow this course one must prove a knowledge of drawing, and, unless excused, must take quarterly examinations in decorative composition.)	
Theoretical course, 200 lessons. Study of textile materials, hand and machine weaving, armures. Different kinds of goods. Pattern cards and reading. Composition of patterns for dress goods.	Daily, except Monday, 10 to 12 a. m.
Practical course. Work in shop, samples, etc.	Daily, except Monday, 8 to 9.30 p. m.
SPINNING AND COMBING.	
Theoretical course	Tuesdays, 8.15 to 9.45 p. m.
Practical exercises with machines	Fridays, 8.15 to 9.45 p. m.
Mechanical engineering	Sundays, 10 to 11.30 a. m.
DIVISION FOR YOUNG WOMEN.	
(Pupils must be 14 years of age. The entrance and class rooms are quite distinct from those of the masculine pupils.)	
DRAWING, ETC.	
Drawing, painting, water colors	Tuesdays and Wednesdays, 10 to 11.45 a. m.
DECORATIVE AND INDUSTRIAL COMPOSITION.	
Style, studies of flowers. Theory of ornamentation	Thursdays, Fridays, and Saturdays, 10 to 11.45 a. m.
EMBROIDERY, LACE WORK, ETC.	
Practical application	Tuesdays, Thursdays, Saturdays, 5.30 to 7 p. m.
Privilege of workshop for course of decorative composition. (Upon obtaining special permission.)	Daily except Monday, 2 to 4 p. m.

ROUBAIX TECHNICAL INSTITUTE.

In addition to the school under Government patronage above mentioned, Roubaix boasts of a thoroughly well-equipped technical school, founded in 1895 by private subscription. This is known as the Roubaix Technical Institute, and is under the direction of the learned Abbé Vassart.

The school is divided into five sections, devoted to (1) spinning and weaving; (2) dyeing and finishing; (3) printing and industrial chemistry; (4) mechanics and electricity, and (5) commerce. In the first four sections the art of production is taught; the fifth deals with the sale of articles produced.

This school, in which instruction is free, is supplied with most complete mill machinery of modern invention in every section, and technical instruction is accompanied by practical work. The machinery in the dyeing and finishing section is perhaps superior to that in any school in France.

In October, 1897, night classes were opened for the purpose of affording operatives and overseers the opportunity of perfecting their knowledge and of giving to employees the opportunity to prepare themselves by a thorough study of mill bookkeeping and commercial correspondence in English and German as accountants, either in local houses or in offices to be established in other countries. These classes have a regular attendance of from 250 to 300 employees, operatives, and overseers. Monthly lectures by professors and directors of factories complete the instruction received by pupils following the night classes.

An association of the old pupils of these classes was formed a few months ago and now numbers 100 members, who are assiduous in their attendance on the monthly lectures.

Pupils under 16 years of age are not admitted to the Roubaix Technical Institute. Applicants must pass an examination to prove that they have sufficient education to benefit by the instruction given in any section and in addition they must give a guaranty of morality required by an essentially Catholic administration.

LILLE.

The Commercial High School of Lille and the Region of the North is worthy of mention as giving solid instruction to youths desirous of fitting themselves for a commercial career. This school was founded in 1892 by the Lille Chamber of Commerce, and while the instruction is chiefly commercial, sufficient technical instruction is given to youths destined to become heads of manufacturing establishments to enable them to direct the work of their divers employees.

As the aim of the school is to give practical instruction to different classes of pupils, it is divided into four sections. Students may, according to their own choice, take the full course or special work in one or more sections.

The section of commerce and banking is the most numerously attended, as most youths do not have a sufficiently clear idea of their future careers to specialize their studies. Particular attention is given in this section to the study of modern languages, English and German being obligatory.

The section of textiles, spinning, and weaving was organized at the request of many spinners and manufacturers of linen, dress goods, and other products of this region. Pupils in this section have one hundred and sixty hours of practical work. For loom work they are sent, under care of a superintendent, to the National Professional School of Armentières, whose workshops are of exceedingly high grade.

The section of coloring matter, dyeing, printing, finishing, and bleaching will be opened this year if the number of pupils entered is sufficient to warrant it. Practical chemical work will be done at the school during the first year; in the laboratories of the scientific faculty during the second year.

The section of brewing, sugar making, and distillery work also responds to the requirements of industry and manufacture in the north of France. The number of pupils in this section may not exceed 18, on account of the necessity of practical instruction in the laboratories of the Pasteur Institute and in factories.

A diploma is issued by the minister of commerce to French and

foreign graduates of this school who have obtained 65 points out of a possible 100 during their scholastic course. This diploma gives certain advantages in competitive examinations for Government positions. It also affords to a certain number immunity from two out of three years of military service exacted under the present law.

The cost of tuition in the Commercial High School of Lille is \$140 a year. Each pupil is taxed \$4 yearly for the care of the material of the laboratory and the commercial museum in the school. Pupils furnish their own books.

According to the terms of a law dated December 28, 1895, diplomas of commercial high schools recognized by the State, like the Lille school, may be delivered to graduates only upon payment by them of \$20 each into the public treasury.

W. P. ATWELL, *Consul*.

ROUBAIX, FRANCE, *September 1, 1904.*

COMMERCIAL INSTRUCTION IN GERMANY.

(From United States Consul Hamm, Hull, England.)

A great deal has been heard about the technical schools of Germany, but very little about the commercial schools of that country. And yet it is probable that the latter have been as potential as the former in bringing about the industrial expansion of Germany. There is an impression abroad that this is an ephemeral manifestation based almost solely upon the aid given by the Government to manufacturing and agricultural interests. This opinion is incorrect. Germany has been preparing for generations for the present great growth in its manufactures and commerce, and has been laying a broad educational basis for industrial progress. This education has been commercial as well as technical.

One of the most striking evidences of the truth of this statement is a recent report on commercial education in Germany by Doctor Rose, the British consul at Stuttgart. This report is printed in a pamphlet of 109 pages and contains a comprehensive review of the educational efforts the Germans have been and are still making to fit their people for business life.

Doctor Rose begins by saying that the movement for the provision of commercial instruction in Germany dates from the beginning of the eighteenth century and manifested itself in the addition of commercial courses and classes to various schools and in the foundation of independent schools for commercial instruction.

The number of commercial schools of all descriptions has multiplied enormously in recent years and in all directions, and the scope of the instruction has been broadened and deepened so as to provide commercial instruction of every possible grade, from the highest facilities afforded by the commercial universities to the lowest afforded by the commercial evening continuation schools.

These commercial schools are divided into three classes, the lower, or continuation schools, the secondary commercial schools, and the commercial universities. The first, or continuation commercial schools, are the most numerous of all the commercial schools in Germany. Their importance has been realized principally during the past fifteen years, with the result that their number and attendance have increased very rapidly.

These commercial continuation schools are either independent or attached to trade schools or schools with general educational subjects, or sometimes to general continuation schools or to industrial continuation schools. The instruction is, of course, much less extensive and more elementary than that given at the secondary commercial schools. It is intended for apprentices and boys engaged in business during the day who can spare only a few hours a week for training in commercial subjects. The instruction is given principally in the daytime from 6 to 9 in the morning, during the midday hours from 12 to 2, and on certain days during the afternoon from 2 to 5. As a rule, from four

to twelve hours' instruction per week is given, the duration of the courses ranging from one to three years. The minimum of preliminary educational requirements is the completion of the elementary school course. A large amount of instruction is still given in the evening, but the tendency in Germany is to substitute, whenever possible, day instruction for evening instruction.

The subjects taught at the Leipzig commercial continuation school, for example, are as follows:

Course of studies in the Leipzig commercial continuation school.

Subject.	Hours per week.		
	First year.	Second year.	Third year.
German	2	1	1
English		2	2
French	2	2	2
Commercial calculations	4	3	3
Commercial knowledge		1	1
Office work and bookkeeping		1	2
Correspondence			1
Commercial geography	1	1	
Writing	2		
Shorthand	1	1	1
Total	12	12	12

The line of demarcation between the commercial continuation schools and the secondary commercial schools is not very well defined; they merge into each other. The entrance conditions are generally higher, however, in the secondary schools, and a definite period of instruction ranging from one to six years is arranged. In order to illustrate the quality and scope of the instruction a Cologne secondary school may be taken as an example. The following table gives the subjects of instruction and the hours per week. The full course lasts six years.

Courses of study in secondary school at Cologne.

Subject.	Hours per week.					
	First year.	Second year.	Third year.	Fourth year.	Fifth year.	Sixth year.
Religion	3	2	2	2	2	2
German	5	5	5	4	3	2
French	6	6	6	6	6	5
English				5	4	4
History			3	2	2	2
Geography	2	2	2	2	2	2
Law					1	1
Calculations	5	5	4	2	2	2
Algebra				2	1	2
Geometry			2	2	2	2
Bookkeeping (optional)					1	2
Natural history	2	2	2	2		
Physics and technology					2	2
Chemistry and knowledge of goods			2	2	2	2
Writing (optional in higher classes)	2	2	2	1	1	
Shorthand				1	1	
Freehand drawing		2	2	1	1	1
Total	25	26	30	32	33	32

Pupils are admitted when from 9 to 10 years old.

The commercial universities for higher commercial instruction have been founded within the last six years and mark a further step in the

development of commercial instruction in Germany. Their aim is to afford to persons engaged in business and industry on a large scale, and to masters at commercial schools, administration officials, bank officials, consular officers, secretaries to chambers of commerce, etc., a deeper and broader measure of instruction in commercial and national economic matters than that provided by the various commercial schools. The special province of the commercial universities lies less in the mere acquisition of commercial-technical knowledge and attainments for immediate practical detailed application than in the attempt to provide a general mental schooling for the higher branches of the commercial profession. They are intended to awaken and develop the mental faculties of the merchant, to enable him to grasp the inner working and meaning of national and international economy, and to understand and judge its causes and results, its temporary and permanent phenomena. So far as commercial officials are concerned they are intended to impart knowledge and understanding of the economic conditions of commerce and industry with their manifold aims and requirements. This university education is also designed to raise the social position of the mercantile profession and to increase its political importance and influence in public life.

Generally speaking, the instruction is arranged to include the following subjects: Political economy, commercial history and geography, commercial law in all its aspects, the organization and management of commercial undertakings and their technical details, industrial law, financial science, banking, exchange, monetary and credit operations, State and administrative law, etc.

The commercial university at Frankfort may be taken as an illustration. It was opened October 21, 1901. It bears the name of Academy of Social and Commercial Science, and is under the supervision of the Prussian minister of industry and commerce. It is not only intended for the instruction of persons engaged in the higher branches of industry and commerce or wishing to devote themselves to these branches, but affords opportunities for study in economic, political, legal, and social subjects. These latter subjects have been added for the benefit of administrative and legal officials, barristers, solicitors, and members of other learned professions who wish to study them from the standpoint of economic development.

The following categories of persons are admitted as fully qualified students:

1. Students from German classical, technical, commercial, and other universities; pupils who have completed the full courses of a Gymnasium or "real" school; pupils who have completed the full courses of the Bavarian industrial schools and of some higher commercial schools.

2. Persons engaged in industry and commerce, insurance officials, and other persons engaged in a definite calling who have acquired the educational standard of the one-year military service and have had at least two years' practical experience at their occupation. Apprentices are not admitted.

3. Masters who have been trained in teaching seminaries and have passed their second examination.

4. Foreigners whose preliminary education is considered satisfactory. The lectures and exercises are subdivided into the ordinary lectures

and exercises and the special exercises held in the seminaries. Only advanced students are admitted to the latter. At present six of these seminaries have been created.

The following table gives a list of the lectures and other work for the summer term of 1904: National economy, national economic seminary, law and consular service, legal seminary, insurance and statistics, insurance seminary, statistical seminary, commercial science, commercial science seminary, seminary for masters at commercial schools, philosophy, history of literature and modern languages, seminary for modern languages, technics, and auxiliary science.

A better idea of the course of instruction can be gained from the following statement showing the number of professors, assistants, and lecturers teaching the various subjects:

Full chairs—National economy, 3; insurance and statistics, 1; private and commercial law, 1; English language and literature, 1; public and criminal law, 1; chemistry, 1; commercial sciences, 1; commercial geography, knowledge of wares, and consular service, 1; languages of Latin origin, 1.

Assistants—Languages of Latin origin, 1; commercial English and French, 1; technical commercial instruction, 2.

Lecturers from Frankfort and surrounding universities and technical universities—Mining, 1; Spanish, 1; chemical technical knowledge of wares, 1; physics, 1; electro-technics, 1; law, 1; commercial politics and exchange matters, 1; public and private philanthropy, 1; history of economics and statistics, 1; social politics, 1; mechanical technology, 1; civil process and bankruptcy, 1.

Total staff, 27.

The aspects of industry and commerce, Doctor Rose remarks, have both changed and increased enormously during the past fifty years. Commercial organizations have become more intricate, more numerous, more far-reaching and world encircling, and vastly more powerful than of yore. The heads of many great industrial undertakings may be likened, in a limited sense, to the absolute rulers of small states or to combined ministers of home and foreign affairs. They negotiate with governments, parliaments, and, perhaps most delicate operation of all, with the representatives of rival undertakings and interests. And unless industrial and commercial life in the future is to degenerate wholly into one fierce and relentless struggle for one-sided aggrandizement, to the detriment of other members of the social body, ample opportunities for the thorough comprehension of the social and economic conditions of the present day must be provided.

More commercial universities will probably be founded in Germany in the course of the next few years. In North Germany they are proposed for Berlin, Hamburg, and Hanover; the Berlin Commercial University is definitely decided upon and the buildings are being constructed. In South Germany they are proposed for Munich, Nuremberg, Stuttgart, and Karlsruhe. As far as can be seen at present, the next commercial university will be founded at Munich or Nuremberg.

Finally, it may be observed that the initiative for the foundation of these commercial universities has been taken by chambers of commerce and municipalities, and not by the governments of the German States. The latter, however, are now becoming aware of the importance of the movement, but for the present their action is limited to the

supervision exercised by the ministers of education and industry and commerce.

The progress made in Germany in the development of commercial instruction can be best demonstrated by a comparison of the present conditions with those which prevailed twelve years ago. In 1892 there existed 175 commercial schools of all descriptions; today this number has increased to 429, besides private schools. The number of pupils in 1892 was 12,000; to-day more than 48,000 may be counted. The increase in the number and attendance of women's commercial schools is still more marked. In 1892 there existed 3 schools with 325 pupils; in 1904, 79 schools with about 5,000 pupils.

Not only have the number of schools and the attendance increased, but a decided improvement in the financial status of the schools has taken place. In 1892 only 50 schools were subsidized by the States; at present the number of schools in receipt of State aid amounts to about 230. In other words, the percentage of State supported schools has risen from 29 per cent in 1892 to 54 per cent in 1904.

These facts will help to demonstrate what immense importance is attached in Germany to commercial instruction in all its manifold branches, and what remarkable progress has already been made in the foundation, organization, and maintenance of schools for this purpose.

Inquiries made in all directions of manufacturers, merchants, dealers, agents, exporters, and importers elicited, with few dissentient voices, an almost unanimous expression of opinion as to the great benefits conferred upon German trade by the provision of thorough practical and theoretical instruction for all classes of persons engaged in commercial callings.

Special notice should be directed to the great attention devoted to foreign languages, especially to English. Profiting by the instruction given in these commercial schools, a large and constantly increasing number of German merchants are able to draw up their own catalogues and circulars in English without extraneous aid, and so contribute to the export of German goods.

Doctor Rose concludes by saying: "This thorough schooling in languages tends, moreover, to deepen the tendency of the young German merchant to regard the whole world as his commercial inheritance. That this tendency exists, and will in the future increase instead of diminish, is evident to those who have followed Germany's rapid change from a mainly agricultural to a mainly industrial nation, with the consequent vital necessity of maintaining and increasing her exports."

The subject of commercial instruction is beginning to attract close attention in England. At the autumnal meeting of the association of chambers of commerce, held in Manchester this week, resolutions were offered from three chambers of commerce on the establishment of such schools. One by the Leeds chamber declared that the Government should subsidize courses in modern languages and commerce in technical institutes and evening schools, as well as in secondary schools. The second, by the Blackburn chamber, asked the Government to promote the extension in secondary schools of courses of general education, suitable for those who are to engage in commercial pursuits, and to encourage specialized instruction in subjects of importance in commerce by adequate subsidies to evening and day schools, technical

institutes, and universities. The third resolution, from the London chamber, declared it to be absolutely necessary to raise the standard and cheapen the cost of technical education.

The United States has many fine technical schools, but it has not yet given the measure of attention to commercial instruction that Germany has. If it is to hold its place in the commercial world it will have to make broader provision for the commercial instruction of its people; and there is no nation from whom Americans can learn more in this respect than from Germany.

WALTER C. HAMM, *Consul*.

HULL, ENGLAND, *September 30, 1904.*

THE BASIS OF GERMAN INDUSTRIAL PROGRESS.

(From United States Consul-General Mason, Berlin, Germany.)

At the dedication of a technical college for the textile industry at Sorau, Herr Möller, the Prussian minister of commerce, spoke with great earnestness and effect upon the peculiar importance of technical education to the present and especially to the future of German industries. He emphasized the fact that competition and other difficulties in the way of foreign trade are steadily increasing, and gave warning that the future holds a struggle for German export trade. Continuing, he said; "Those whom we have been pushing out are beginning to defend themselves. Our former markets are becoming producing countries, and we shall doubtless have to see certain branches of our business decline and pass over to other countries which have cheaper labor than we. Hence we shall be more and more obliged to perfect our industries, and not only to follow up promptly all novelties and changes of taste, but to take the lead in creating such changes." In a word, Germany, being mainly dependent upon foreign markets, requires the highest technical development to maintain her place in the competition.

The lesson embodied in these words of the minister of commerce finds many illustrations in the various fields of German industry, but in none is the demonstration more striking and conclusive than in the department of chemical manufacture, of which the total annual product is valued at about \$300,000,000. The organization of chemical study and research in Germany for industrial purposes was begun by Prof. Justus von Liebig, who set up the first up-to-date university laboratory at Giessen about fifty years ago. The great work of Liebig was to train a number of able pupils to work by his methods, to explore the secrets of nature, and to find what processes, analytic and synthetic, could be made to serve the practical needs and purposes of mankind. His example and achievements had the important result of convincing the several State governments of Germany that it was wise and would in the end prove profitable to found and maintain advanced schools for scientific study.

From these technical schools and the laboratories of German universities have come the army of young chemists who have made applied chemistry the most vigorous and successful, as it is the youngest, of German industries. It is a threadbare statement that four-fifths of all the world's annual product of dyestuffs, as well as a large proportion of the medical preparations derived from coal tar, are made in Germany. The aniline industry began in Great Britain, which is the largest producer of benzole, and spread to France, Switzerland, and Germany. In the latter country it was met by a throng of trained chemists just out of the technical schools and universities, bright, energetic, and eager to investigate everything and to make long, patient, persistent studies in any line.

It is these men, who now number between six and seven thousand, who are willing to work in original research, in laboratories provided by the great chemical companies, for small salaries and an interest in whatever of value they may discover, who have brought the chemical industry of Germany up to its present leading position and kept it there. They have made it possible for Germany to import benzole from Great Britain, Belgium, and Austria-Hungary, and to sell its ultimate products, multiplied many times in value, to all civilized countries. Not less than 29,336 tons of these precious materials were exported in 1902, of which 5,650 tons went directly to the United States, 6,334 tons to Great Britain, 1,623 tons to British India, and 2,178 tons to China.

The history of one of these coal-tar products—artificial indigo, made synthetically from anthracene—reads like a romance. In 1892 the German Empire imported 3,556,740 pounds of natural or vegetable indigo, valued at \$4,450,000. In May, 1897, Doctor Bayer, a chemist at Munich, solved the problem of making indigo synthetically, since which time the value of German imports of the natural dyestuff has sunk to \$833,000 in 1902, while the exports of artificial indigo have risen to 9,154 tons in 1903, of which 2,743 tons went to the United States.

The careful analyses of soils and the skillful use of chemical and other fertilizers to meet exactly the deficit in essential elements has revolutionized agriculture in this country. It is due largely to the work of expert chemists that the percentage of saccharine content in sugar beets has been raised from 5.72 per cent in 1840 to 13 per cent in recent years, whereby the whole German sugar industry was saved from collapse. Similarly in the iron and steel manufacture and in the whole long, varied schedule of textile production it is only the possession of a vast army of skilled chemists, metallurgists, designers, dyers, weavers, and spinners, recruited year by year from graduates of the universities and technical and industrial art schools and backed by salesmen and merchants elaborately educated and trained for commercial work in foreign countries, that has enabled Germany to practically monopolize certain special forms of manufacture, and, despite limited natural resources, to conquer and maintain a place in the front rank of industrial nations.

FRANK H. MASON, *Consul-General*.

BERLIN, GERMANY, *September 2, 1904.*

ZITTAU TECHNICAL INSTITUTE.

(From United States Consul Pike, Zittau, Germany.)

There can be no doubt that industrial education has become a matter of great importance and a theme that is engaging the serious attention of all progressive countries. It is a new and live element that enters into all discussions of industrial problems and trade development. The highest authorities attribute the wonderful industrial growth of some nations largely to the system of training in technical colleges and trade schools which produces a nation of experts. So essential is such training considered to trade development of modern times that all governments are now regarding the subject with grave concern.

The recent founding of a \$3,000,000 trade school in Massachusetts, and the general consideration given the subject of technical education throughout the United States, makes a treatment of this subject pertinent and timely. There is probably no country in the world where the system of trade schools and technical education has reached such a stage of perfection and is so generously supported as in Germany.

While there are hundreds of technical schools in Germany, covering every branch of trade and profession, there are but two or three of the university character of the Zittau Höhere Webschule, and of these, it can be safely stated, none takes a higher rank than the Zittau institute.

It is well to observe that in this consular district municipalities, as well as the Government, are very energetic in providing for industrial schools. They do this in order to give manufacturers and tradesmen a chance to acquire a thorough technical knowledge of their respective branches of trade.

There is hardly any trade of importance that has not its school. In this consular district one finds special industrial and industrial continuation schools, trade schools, engineering and architectural schools, and weaving schools. The Zittau Höhere Webschule, however, deserves special recognition. The whole of the Upper-Lausitz being extensively engaged in the textile trade, the building of a higher weaving school in the district was a matter of great importance. There are other and older weaving schools in this district, but their purpose generally is simply to meet the requirements of local industries, whereas the Zittau Höhere Webschule was established with the purpose of meeting the requirements of all branches of the textile trade.

The founding of trade schools in Saxony, and generally throughout Germany, is not a purely State affair. Sometimes the city or town establishes the school through the instrumentality of the board of trade or the chamber of commerce. The Government often unites with the tradespeople in the building and support of a school. In this way the Zittau institute was founded by the State, city, and tradespeople, and was erected in the year 1898. The cost of the building and machinery was about \$71,400, and the school is maintained as follows: The government of Saxony grants yearly \$2,380, the chamber of

commerce and board of trade \$1,190, and the city provides whatever deficit there may be. The current expenses per annum are about \$8,330.

The purpose of the institute is to produce manufacturers, superintendents, managers, overseers, or designers by means of practical and theoretical instruction. There are courses for buyers and salesmen of textiles wherein these obtain a pretty thorough knowledge of the different processes of manufacturing, as well as of yarns and the finished cloths.

Instruction is given in three classes: (1) A day class for intending manufacturers, managers, buyers and salesmen of textiles; (2) a day class for cloth designers, male and female; and (3) an evening class for clerks, apprentices, weavers, etc. All persons over 15 years of age who have a good school record are eligible to enter the institute. The ages range from 17 to 50 years, and students are registered from all parts of Germany, Austria-Hungary, Sweden, Russia, Belgium, and other countries.

The tuition per term is as follows: Class 1, \$23.80; class 2, \$11.90; class 3, \$1.19. Foreigners are charged double these rates. The complete courses are arranged to extend as follows: Class 1, three terms, or one and one-half years; class 2, four terms, or two years; class 3, one year. Students who pass good examinations get a special recommendation, and in order to stimulate study, prizes are given at the end of each term. Classes 1 and 2 have each forty hours of instruction weekly, and class 3 has seven hours.

The chief subjects are cloth construction in plain and fancy weaves, drawing, designing, sampling, yarn and cloth testing, spinning, practical hand and power loom weaving, textile machinery, preparing and dyeing, and finishing machinery. Bookkeeping and the English language are optional subjects.

The institute is furnished with all kinds of apparatus and instruments, and the weaving shed contains 42 different kinds of power looms, besides 18 hand looms, which the students operate daily. From the beginning the institute was furnished with the most advanced machinery, and a reserve fund is provided for the purpose of purchasing all the latest improvements.

A large supply of samples of specialties is kept to show pupils the designs in finished articles. Painting of natural flowers and sketching from nature are taught to form the groundwork of designing. For this department the Government appropriates \$238 each year for the purchase of rare and specially well-designed articles from different countries. A library of practical works is at the disposal of pupils, and a collection of patent drawings and materials is kept for their instruction.

Up to the present time the school has been very successful, and was awarded the first prize, viz, a State medal, at the Oberlausitzer Exposition in the year 1902. It is under the able management of Dr. Ing. Desiderius Schatz, a Hungarian, who took his diploma as a mechanical engineer in Zurich, and was the first in the textile industry to receive the degree of doctor. He has advanced from being assistant at the Technical High School in Dresden for textile industry, and teacher in the High Weaving School in Berlin, and superintendent of the technical department of the Königlische Centralstelle for the textile industry in Berlin.

WILLIAM J. PIKE, *Consul*.

ZITTAU, GERMANY, *May 3, 1904.*

COMMERCIAL SCHOOLS IN JAPAN.

(From *Österreichische Monatsschrift für den Orient*, an Austrian journal devoted to oriental affairs, for May, 1904.)

HISTORY AND SCOPE.

Within the last decade the most important commercial nations of Europe have discovered the importance of higher theoretical commercial education, and have established institutions devoted to commercial studies, thereby acknowledging this system of education to be of equal value with that furnished by the universities. At a much earlier time Japan gave attention to this important branch of education. Years ago a uniform and well-planned regulation of commercial education was carried out by the Empire, and many undertakings which in European countries were matter of speculation and hope were effecting enormous results in the educational development of the Island Empire.

The schools were established in an almost incredibly short time. As early as 1875 the first commercial institute was established in Tokyo. Since that time similar schools have been established in various parts of the Empire. In 1884 the commercial schools were regulated by ministerial decree, and in 1899 a general law was passed concerning commercial educational institutions. In accordance with this law the commercial schools are divided into two categories.

(1) The schools of the first grade take students in their fourteenth year, after they have graduated from a four-year course in a higher common school, and demand a knowledge of at least one foreign language. They offer a three-year course, which may be increased by one year, if necessary. The number of hours of school work per week which may be taken by a student shall not exceed thirty-three. Pupils may take special courses and enter at the age of 14. Courses are offered for persons desiring to do advanced work, but shall not extend beyond two years.

(2) In the schools of the second class, instruction continues for a period of three years. Pupils 10 years of age may enter, and the number of hours of school work shall not exceed thirty per week.

Above the commercial schools of the first grade stand the commercial high schools, so that Japan has in fact three grades of commercial schools, which differ from the usual European schools in that they are built one upon the other. This difference must, without doubt, have an influence upon the thoroughness of education, since a student who has passed through the series of schools and has put in eight or ten years' study in commercial branches must be better equipped than one who has had only two or three years' preparation.

COMMERCIAL HIGH SCHOOL AT TOKYO.

History.—At present there are commercial high schools at Tokyo and at Kobé. The one at Tokyo was founded in 1875 by Viscount

Mori as a private school, and was taken under the control of the State in 1884, and put in charge of the minister of commerce and agriculture. In 1885 it came under the direction of the minister of education. At the same time the school was consolidated with the school for foreign languages, and in 1886 it was further consolidated with the school for banking, a school for apprentices being added. In 1887 the school was reorganized under the title *Koto Shogyo Gokko*. This school adopted some of the methods of the *École des Hautes Études Commerciales*, of Paris, and the *Institut Supérieur de Commerce*, of Antwerp. There followed many other changes in the years that came after, with the object of bettering the organization. Although the institution, from its inception in 1875 until 1893, had to deal with many financial difficulties, it has been brought to a high state of development by its chief, Jiro Yano.

The business men of Japan were not altogether friendly to the system, because they preferred to take young men without much training and mold them as they desired. The school at Tokyo has endeavored to prove its value to Japanese commercial circles, and it has had the assistance of a committee of leading merchants, bankers, and State officials.

In 1897 there was added a course, extending over a period of one year, open to graduates of commercial high schools and other high schools who wished special training. In 1899 the course was made to include two years.

Courses.—At present there are three courses available, namely, a preparatory course of one year, a course of three years, and a graduate course of two years.

The preparatory course includes the following studies, the figures representing the hours a week devoted to each study: Japanese writing, 1; Japanese composition, 2; mathematics, 3; bookkeeping, 3; technology, 3; practical physics, 1; general law, 2; general economics, 1; English, 9; French, German, Russian, Spanish, Italian, or Korean, 3; gymnastics and military exercises, 3.

The three-year course is as follows:

Studies in the three-year course of the Tokyo Commercial High School.

Studies.	Hours weekly.		
	First year.	Second year.	Third year.
Commercial ethics	1		
Japanese commercial correspondence	1		
Commercial arithmetic	2	3	
Commercial geography	2	2	
History of commerce			3
Bookkeeping	2	2	1
Machinery	1		
History of articles of trade	2	2	
Economics	3	3	3
Science of finance			2
Statistics		1	
Civil law	3	3	3
Laws of bankruptcy			1
Commercial policies			1
International law and international civil law			2
English	6	6	6
French, German, Spanish, Russian, Chinese, or Korean	3	3	3
Science of commerce	2	7	
Commercial correspondence and other office work			5
Gymnastics and military exercises	3	3	3

The higher course includes the following studies, the figures representing the hours devoted weekly to each study during the first and second years: Economics, 4, 4; personal law, 2, 3; Japanese commercial law, comparative international commercial law, 3, 2; international law and international civil law, 2, 2; commercial composition and office management, 2, 0; economic relations of eastern Asia, 2, 0; history of the relations of the foreign powers at the present, 9, 2; criminal law, 2, 0; English composition, 2, 2; other foreign languages, 5, 5. In the professional division of the higher course the student may also choose seminary work in commerce, banking, railroading, shipping, insurance, and the consular service.

The students in this course take an examination and prepare a dissertation on some subject relating to commerce, thereby earning the degree of "doctor of commerce."

The course in commercial ethics, which subject is not taught in European commercial schools, and the numerous courses in foreign languages are worthy of note. A striking characteristic of the school is the care and attention bestowed upon the keeping of books, offices, etc., in the neatest condition possible compatible with success in business.

It is interesting to note the plan of chemical and mechanical technology which has been taken up. The specialization of educational subjects and their technical and methodical arrangement are open to criticism, and are not just what Japan would like to have them. The same objections apply to the European arrangement. Still the commercial high school with which we are dealing has produced good results. Its graduates are receiving positions corresponding to their abilities; they enjoy considerable respect, and in the development of the economic conditions of their country exercise a praiseworthy influence.

Along this line of work the exemplary institutions of Antwerp and other cities of Europe are surpassed. In fact, the Commercial High School of Tokyo leads all others. The needs of Japan will probably soon be supplied and existing evils will be eradicated. No other nation, perhaps, is studying the problems of civilization to so great an extent.

Notwithstanding the rapid progress Japan is making, it is evident to those interested that there is a necessity for greater attention to foreign languages. In 1897, by imperial decree, the study of languages in the school was made independent. The instruction extends over three years with twenty-four hours weekly in English, German, French, Russian, and Spanish, and twenty-seven hours weekly in Chinese and Korean.

In 1899 there was added to the school a commercial seminary with the following subjects, covering two years, the figures representing the weekly hours of work for the first and second years: Ethics, 1, 1; business arithmetic, 2, 2; correspondence, 1, 1; commercial geography, 2, 2; history of commerce, 1, 2; bookkeeping, 6, 3; history of articles of trade, 2, 2; economics, 2, 2; commerce, 7, 2; commercial law, 0, 4; office practice, 0, 5; English, 5, 4; pedagogy, 1, 0; seminary, 0, 1; gymnastics, 3, 3.

Administrative and instructing force.—The affairs of the school are managed by a committee on education, which includes representatives of the minister of education and leading business men, as well as the

director of the school. The immediate supervision of the school is in the hands of the director. The faculty consists of 14 ordinary professors, 12 head professors, and 7 secretaries. In the college for foreign languages there are 15 ordinary professors, 8 head professors, and 3 secretaries.

In this school and that at Kobé there are at work in the foreign language departments almost continually from ten to fourteen foreign professors. The sample office is also in charge of a foreigner. It is to be noted that these men will be replaced from time to time by competent Japanese.

Fees.—The fee for the preparatory course and the course in foreign languages is \$10; for the other course, \$12.50. The instruction in the teaching seminary is gratuitous, and in addition there are stipends for those who will promise to teach commerce for three years after graduation.

Attendance.—From 1875 to 1897 there were graduated 775 students, more than one-tenth of whom were foreigners. In 1898-99 there were 503 students, divided as follows: Preparatory course, 173; first year, 144; second year, 106; third year, 66; and higher professional course, 14. In the course for foreign languages there were 178 regular pupils and 218 occasional attendants. The age of the students in the preparatory course varied from 16 to 23 years, and in the main course from 17 to 26 years. In 1897-98 the high school had 455 students and the school for foreign languages 282 occasional pupils. In 1903-4 the number of students in the preparatory course was 297; in the main course, 692, and in the advanced course, 95; total, 1,084. In the commercial seminary there were 28 students.

Other features.—In connection with the commercial high school there is a commercial museum containing a collection of various wares.

In 1890 the school went into its new building, which was built at an expense of \$144,329.

COMMERCIAL HIGH SCHOOL AT KOBÉ.

History.—In 1889 steps were first taken to establish a commercial high school at Kobé. It is to be completed by the end of 1904, and some instruction was begun March 15, 1903.

Courses.—The organization and the lecture course correspond to those of the school at Tokyo, but the preparatory course extends over only one year, and there is but one other course of three years.

The main difference between the schools of Kobé and Tokyo consists in the separation of the preparatory course at Kobé into two departments; the first for graduates of middle schools and the second for graduates of the commercial middle schools. This separation is a considerable step in advance.

The first division of the preparatory course is as follows, the figures representing the hours devoted in a week to each study: Ethics, 1; Japanese composition and writing, 2; business arithmetic, 4; book-keeping, 5; general commerce, 2; general law, 2; English, 10; gymnastics and military exercises, 3. The second division is as follows: Ethics, 1; Japanese composition and writing, 2; Japanese and Chinese literature, 2; mathematics, 4; physics, 3; chemistry, 3; natural history, 2; general jurisprudence, 2; English, 10; gymnastics, 3.

The main course has the following studies, the figures representing the weekly hours devoted to the study of each during the first, second, and third years: Business ethics, 1, 0, 0; Japanese commercial correspondence, 1, 1, 0; business arithmetic, 2, 0, 0; commercial geography, 2, 2, 0; history of commerce, 0, 0, 3; history of articles of trade, 2, 2, 0; economics, finance, and statistics, 4, 3, 3; personal law, commercial law, bankrupt law, international civil and international law, 4, 3, 5; science of commerce, commercial correspondence, and office practice, 5, 4, 8; bookkeeping, 3, 2, 0; English, 6, 6, 0; Chinese, French, German, Russian, 5, 5, 5; gymnastics, 2, 2, 2.

Faculty.—The faculty of the Kobé school consists of a director, 6 ordinary professors, 1 head professor, 6 lecturers, and 8 other officials. During the current year there were in the preparatory division for graduates of secondary schools 130 students and in the section for graduates of commercial schools 42, making a total of 173 students.

Japan has, therefore, two well-attended commercial high schools, although it seems that it will not be long until they will not answer the demands of the people. This fact is shown by the large number of applicants who could not be admitted to the new school, as well as the efforts which have been made to establish schools at Nagasaki and Nagoja. The school at Nagasaki should be ready by September. In organization and courses this school will be similar to that at Kobé. There is also an institution at Osaka which is frequently termed a commercial school, but in organization and curriculum it is more nearly related to the commercial academies of Austria.

TECHNICAL EDUCATION IN LONDON.

(From United States Commercial Agent Harris, Eibenstock, Germany.)

The London Daily Telegraph of October 14, 1904, contains the following article in regard to technical education in London:

Now that primary and secondary education in London are brought by the new act under the control of one authority, the technical education board of the London County Council has ceased to exist. The last report, just issued, is eloquent of the work which has been done in the past decade, and the opportunity is naturally seized to indicate the actual progress made. It is a story of which the members and the officials have reason to be proud.

The most striking features of the record are the increase and rapid development of polytechnic institutions, the establishment and success of London County Council schools and technical institutes, and the improvement in the equipment and appointment of teachers of secondary schools. A great advance has taken place in the volume and character of evening instruction in science and technology. Whereas nine years ago instruction in trade subjects was given in only 113 centers, now the classes embrace 64 different occupations and the work of instruction is carried on in 313 places. The number of distinct trades in which practical instruction is provided, and also the number of centers providing such courses of instruction, have more than doubled during the past nine years and the number of apprentices and young workmen attending them has increased fourfold. Even these striking figures do not accurately represent the progress effected. For example, in carriage building there were two centers in 1903, against three in 1894, but in 1894 the instruction consisted entirely of lectures and demonstrations, there being no systematic courses of practical work. The establishment of the London County Council School of Carriage Building has naturally attracted students from all parts of London, and so has reduced the number of centers. Similarly, there is only one center in tanning, against two in 1894, but in 1894 the instruction was entirely theoretical. The establishment of Harold's Institute, a properly equipped tanning and dyeing school, has removed the necessity of instruction in other centers. There has also been a natural tendency during the past few years for sporadic classes in trade subjects to disappear in consequence of the increasing popularity of the polytechnics and larger technical institutes, in which are found thoroughly equipped laboratories and workshops.

As to the polytechnics, the board give a list of twenty-six of these institutions now in full work. It is pointed out that the rapid growth of polytechnics in different parts of London since the formation of the technical education board in 1893 has had a great effect in the development of evening instruction, and, moreover, that this success has

not been achieved at the expense of other institutions; it represents a new growth, not the transfer from old to new institutions. Many changes have taken place in the older polytechnics to bring them more into touch with modern requirements, and this has been accompanied in nearly every case by an increase in the volume of instruction. An interesting table is given of the instruction in mechanical engineering, electrical engineering, carpentry and joinery, plumbing, other building-trade classes (including brickwork and masonry), experimental physics, chemistry (organic and inorganic), and mathematics. It shows an increase from 118,732 student hours in the first year of the board's operation to 454,363 student hours in the session 1900-1901. Since then the number of artisan students has been steadily increasing, and the inspectors' reports indicate that a far greater number of artisans are pursuing systematic courses, entailing attendance on several evenings of the week.

In addition to the polytechnics and schools of the university there are smaller institutions in various parts of London, some of which simply give instruction in specific trades, while others give instruction in general scientific and technical subjects. The County Council has supplemented former facilities by special schools and institutes for highly advanced subjects, such as the Central School of Arts and Crafts, the London Day Training College, and the School of Photo-engraving, while several districts have been supplied with schools and technical institutes.

An important innovation was the establishment of London County Council scholarships, so graded as to form a ladder from the elementary schools upward, in many cases to a university. Particulars are given of the occupations of the parents of the 614 boys and girls to whom junior county scholarships were awarded in 1903. The majority of the scholarships have fallen to the children of workers in trades (mostly journeymen) and unskilled laborers, who have gained 375 out of the 614 scholarships, or 61 per cent. Children of officials and servants obtained 15.5 per cent, shopkeepers and assistants 2.79 per cent, and clerical and subordinate professions 16.4 per cent. In addition, intermediate and senior scholarships are awarded. The junior scholarships have formed a link between the public elementary and secondary schools, and the "intermediate" scholarships, numbering about 100 annually, the board claim, have carried out and deepened the connection which the junior scholarships have already established between elementary and secondary education, but they have also formed a link between secondary schools and the universities. Providing free education till after the age of 18, these scholarships enable pupils to remain at school long enough to compete for university distinctions.

Several of the endowed grammar schools of London are therefore now able to keep their most promising pupils long enough for them to enter for open scholarships at Oxford or Cambridge, and the council's intermediate scholars have already won credit for their schools by distinguishing themselves at these competitions. In addition to the intermediate scholars who proceed to the older universities after the expiration of their scholarships, there are every year several who enter institutions of university rank in London for the last two years' tenure of their scholarships. The final stage in the Council's scholarship

scheme is marked by the senior county scholarships, which provide a maintenance grant of \$300 a year for three years, and carry with them in addition payment of tuition fees up to but not exceeding \$150 a year. Five of these scholarships are offered for competition each year, the award being made by selection and based on the past work and future promise of the candidates. In addition to these full senior scholarships, the steady growth in the number of scholars coming up from the elementary schools has compelled the board to provide for their continued education by exhibitions and free places, of which about forty are now given annually. Last year out of 28 candidates who gained senior scholarships and exhibitions (apart from free places), 21 were holding intermediate county scholarships, and 14 out of the 21 had previously held junior county scholarships.

ERNEST L. HARRIS, *Commercial Agent.*

EIBENSTOCK, GERMANY, *October 19, 1904.*

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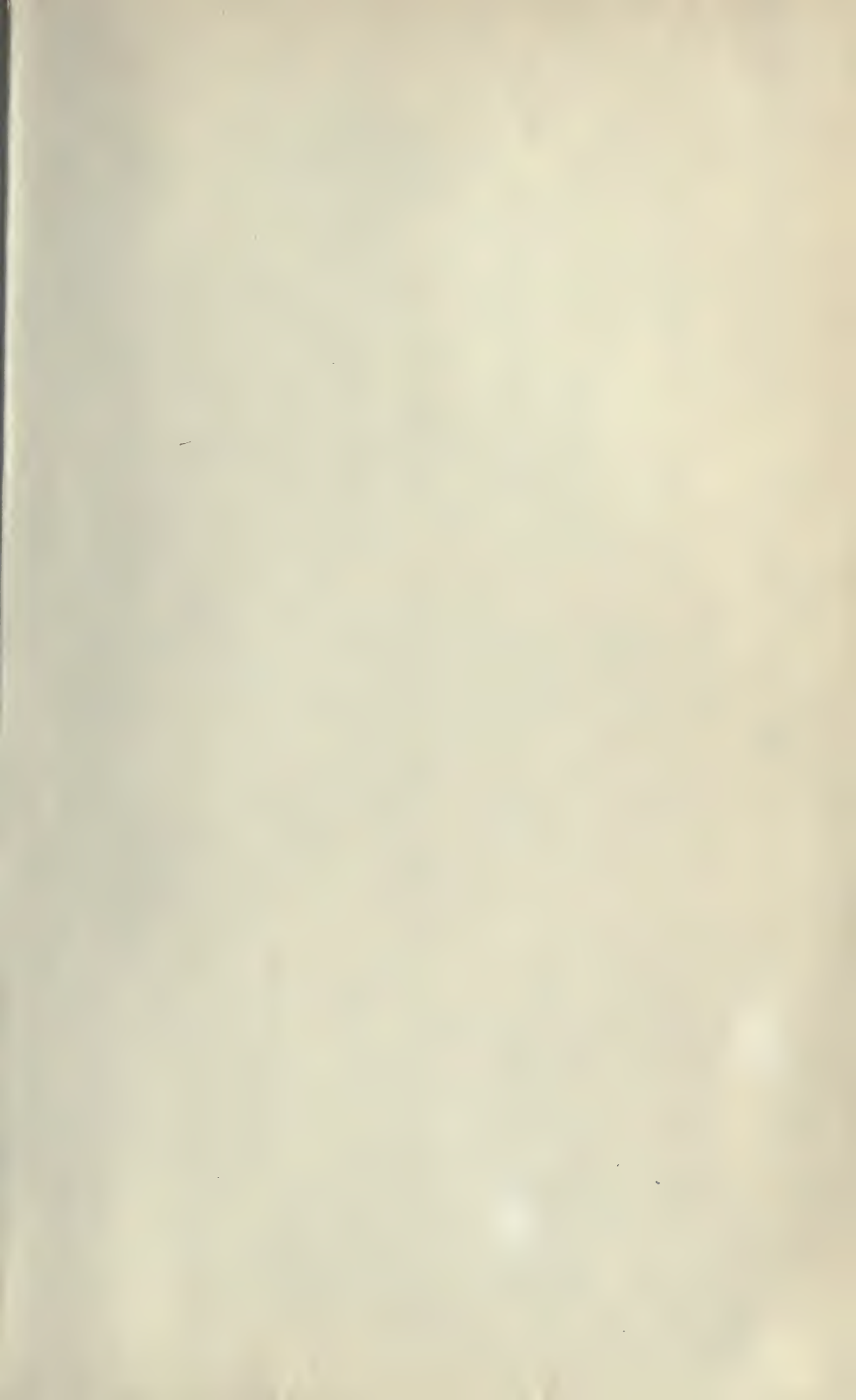
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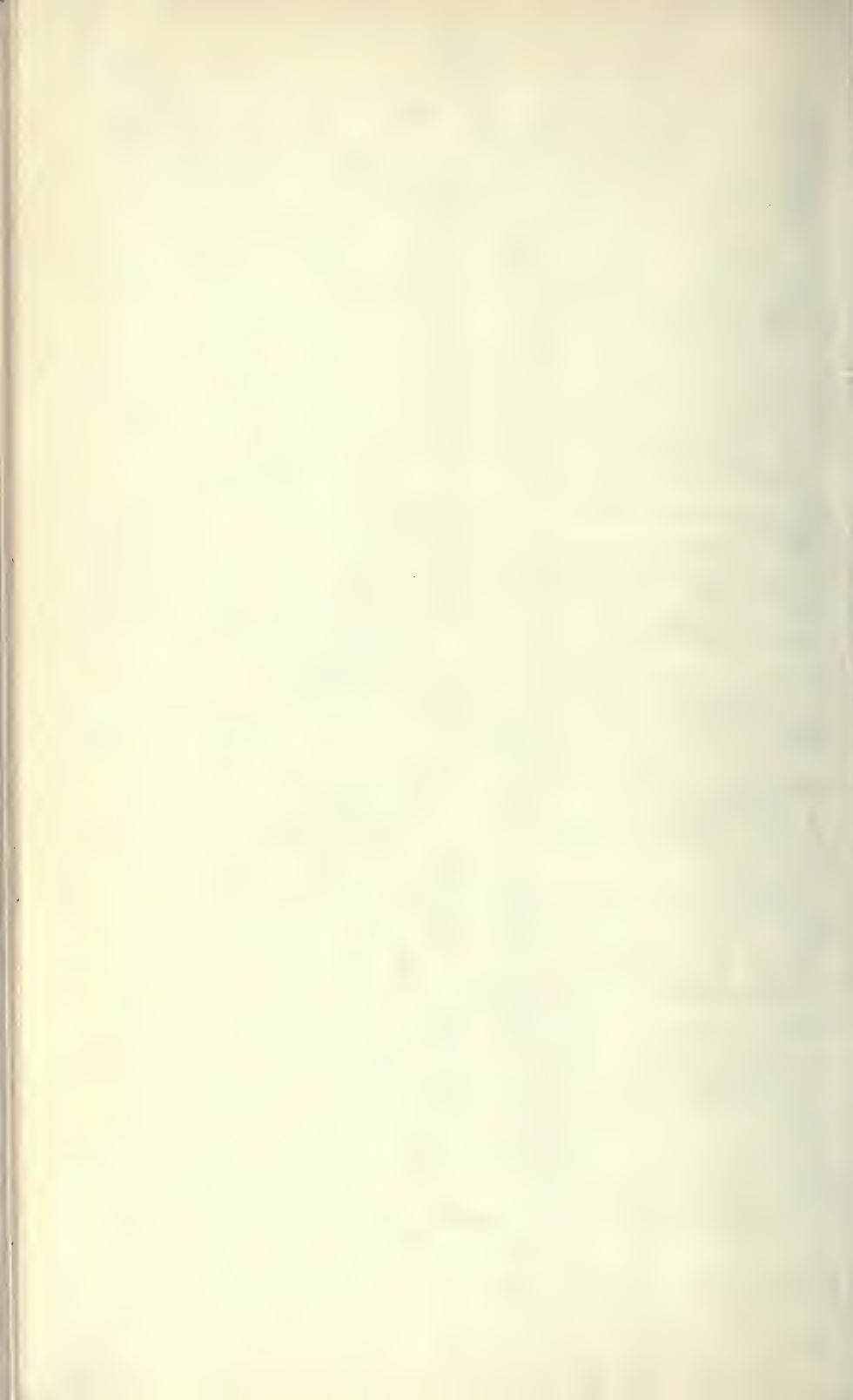
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